COBOL Programming

Duration: 5 Days

Audience:

Application Programmers with little or no previous experience in COBOL who require formal training in the basic language features and programming techniques.

Pre-requisites:

An understanding of computer concepts is assumed.

A working knowledge of TSO/ISPF is required. This can be gained from our z/OS TSO/ISPF Workshop.

Course Objectives

Each delegate will acquire a working knowledge of COBOL and will gain a solid foundation in the fundamentals of COBOL coding including program structure, design, execution and debugging. The concepts of structured programming are introduced with examples and explanation. Good programming practice is encouraged throughout. The course starts with the basics and furthers learning with 28 hands on assignments until delegates are capable of complex programming logic and design.

Course Content

Module 1: Documentation & Ancillary information

The COBOL manuals.
The manuals relating to both CICS/TS and SQL.
Some useful z/OS environmental manuals.
Where COBOL executes and a brief history

Module 2: Syntax & Structure

A short sample program
Coding rules
Introduction to the four main Divisions
An overview of the ACCEPT, DISPLAY and MOVE instructions
Introduction to arithmetic instructions
An explanation of decision making
How to terminate a program, EXIT PROGRAM, GOBACK and STOP.

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Module 3: Compiling and Debugging

Where is COBOL held, both source and executable.
Compilation process for vanilla COBOL programs
Compilation implications for CICS/TS and DB2/SQL programs
Common Link/Bind Control Statements
Compilation errors and correct
Run-time errors and correction
Debugging aids; focusing on the DISPLAY instruction
Using LE to obtain a memory dump – CEEDUMP service

Module 4: Define, Move and Initialize fields

DATA DIVISION, both WORKING-STORAGE and LINKAGE SECTIONs
Basic field definition, PICTURE, VALUE and USAGE clauses
Group Structures
Defining Conditions, 88 levels
Overlaying memory – REDEFINES clause
PROCEDURE DIVISION elements
Defining literals
Using figurative constants
MOVE instruction, including the CORRESPONDING clause
COPY statement, including pseudo-text
Overview of DB2/SQL requirements

Module 5: Sequential Record File Processing

File types
BSAM vs QSAM
File processing overview
File allocation, SELECT statement
File definition, FD statement
File instructions; Open, Read, Write, Rewrite and Close
Using FILE-STATUS to handle error conditions
Using Variable Length Records
Using VSAM ESDS Clusters
Static vs Dynamic SQL

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Module 6: Structure Programming

Understanding unstructured issues
Structure programming terminology
PERFORM instruction, simple format
PERFORM instruction, iterative format
PERFORM instruction, conditional execution format
PERFORM instruction, VARYING format
CALL Instruction

Module 7: Decision Making

Condition terminology
Relational expression and operators
Using figurative constants within relational expressions
Condition names, 88 levels
IF-THEN-ELSE construct
Nested IF instructions
EVALUATE-WHEN-OTHER instructions
Setting a condition to be TRUE

Module 8: Arithmetic

COMPUTE instruction
ADD instruction, with and without the GIVING clause
DIVIDE instruction
MULTIPLY instruction, with and without the GIVING clause
SUBTRACT instruction, with and without the GIVING clause

Module 9: Working with Dates

Obtaining date and time using the ACCEPT instruction.
Obtaining the Julian Date
Determining the Day of the Week
Other Date Functions; CURRENT-DATE, DATE-OF-INTEGER, DAY-OF-INTEGER, INTEGER-OF-DATE, INTEGER-OF-DAY, and WHEN-COMPILED.

Module 10: Manipulating Characters

Referential Modification
Character Functions; CHAR, LENGTH, LOWER-CASE, ORD, REVERSE and UPPER-CASE.
Combining text; STRING instruction
Segmenting text; UNSTRING instruction

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Converting, counting, and replacing characters; INSPECT instruction

Module 11: Arrays and Tables

Initialization; both Group Level VALUE clause and the INITIALIZE instruction.
Subscripting
Using an Index, including the SET instruction
Perform a sequential search; the SEARCH instruction
Perform a binary search
Handling variable table lengths

Module 12: Sub-programs

Using either static or dynamic linkage; CALL instruction
Sub-program considerations
Receiving parameters
Termination the sub-program; EXIT-PROGRAM and GOBACK
Delete a program from memory; CANCEL instruction
Alternative entry points; ENTRY instruction
Issuing a Return Code
Issuing User Abends (U0001-U3999)
Accessing the JCL EXEC statement PARM information

Module 13: Indexed File Processing

File types
File processing overview
Making COBOL aware of the VSAM KSDS; SELECT statement
Defining the cluster; FD statement
File status information
File instructions; Delete, Open, Read, Rewrite, Start, Write and Close.
Using Alternate Indices and their JCL implications

Module 14: Relative File Processing

File types
File processing overview
Making COBOL aware of the VSAM KSDS; SELECT statement
Defining the cluster; FD statement
File status information
File instructions; Delete, Open, Read, Rewrite, Start, Write and Close.

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Module 15: Dynamic File Allocation

Static vs Dynamic allocation and impact on JCL
Using BPXWDYN for input files
Using BPXWDYN for output files
Using setenv for input files
Using setenv for output files
Using the envar variable

Module 16: Dynamic Memory Allocation

What does my Address Space look like?
Dynamic memory Allocation Overview
Memory mapping; LINKAGE SECTION and POINTERs
ALLOCATE instruction syntax and use
FREE instruction syntax and use

Module 17: Server Interfaces

Introducing JSON
WORKING-STORAGE implications
Generating JSON wraps
Unpacking JSON wrapped data
Introducing XML
WORKING-STORAGE implications
Generating XML wraps
Unpacking XML wrapped data

Module 18: Using the SORT feature

Adding perspective, the SORT data flow
Input filtering; E15 Exit
Output filtering; E35 Exit
Making COBOL area of the file; SELECT statement
Defining the file; SD statement
Performing the sort; SORT instruction
Passing a record to the sort; RELEASE instruction
Retrieving a sorted record; RETURN instruction
How to cancel the sort