

## **Enterprise COBOL Debugging & Maintenance (2 Day)**

### **Benefits**

The student learns how to use the Language Environment (LE) and COBOL facilities for debugging as well as how to effectively do maintenance on a module that has been debugged. The Program Binder is also discussed extensively.

### **Audience**

COBOL programmers who need to know how to code calling and called programs (subroutines) and who need to know how to debug these programs in the LE environment; programmers who need to know how to use the Program Binder for maintenance.

### **Prerequisites**

Basic understanding of the COBOL language, and a working knowledge of how to code JCL statements. Fundamental understanding of CALL statements and basic subroutine concepts.

### **Major Topics Include**

- Overview of Language Environment
- COBOL compiler options, inputs, outputs, and cataloged procedures
- Sources of information
- Anatomy of a COBOL compile listing
- LE dump reading
- Subroutines and parameters
- Static and dynamic calls
- The Program Binder
- LE condition handling concepts
- The LE run-time environment
- Debugging features of the language
- LE debugging services (CEE3DMP, CEE3ABD, CEETEST)

### **Exercises**

There are 3 hands-on exercises.

## Enterprise COBOL Debugging and Maintenance - Topical Outline

### Day One

Language Environment - An Introduction

What Is LE?

LE Conforming Programs

LE Services

Invoking LE Services

LE Program Management

Introduction to Debugging and Dump Reading

Computer Exercise : ONION Debugging Program

Guidelines for Debugging

The School of Footprints and Breadcrumbs

Program Termination

Sources of Information

IBM Publications

Quick Reference

Messages and Clues

File Related Messages

Common System Completion Codes

Program Check error Codes

Common LE Completion Codes

Lab Time for ONION

Anatomy of a COBOL Compile Listing

Machine Instructions

Executable Programs

Lab Time for ONION

Dump Reading - Introduction

LE Dump Reading

Locating Data Items in an LE Dump

Common Errors to Watch For

Locating Index Information in a Dump

Locating Data in a Program's Linkage Section

How the COBOL compiler works

Data sets

Compiler Params

PROCESS Statement

### Day Two

Subroutines and parameters

CALL Syntax

Enhancements to Parameter Passing

Returning Values

Multiple ENTRY points

The Program Binder

Object Modules and Load Modules

CSECTs

Binder Control Statements and PARMs

Binder Processing

The Program Binder and Maintenance

Application Programming to get PARM Data

Computer Exercise: Program Binder and Maintenance

More About the Program Binder

Load Modules vs. Program Objects

Binder Params

Binder Inputs

LE Condition Handling

Condition Handling Concepts

Standard LE Processing for T\_I\_U and T\_I\_S

Dynamic CALL, CANCEL

COBOL Source Debugging Techniques

Subscript Checking

DISPLAY

DEBUGGING MODE (Compile Time Switch)

Declaratives

TEST and CEEDUMP

Runtime Options

Computer Exercise: Using TEST

LE Debugging Services

CEE3DMP, CEE3ABD, CEETEST

LE: The Run-Time Environment

Specifying run-time parameters

LE run-time parameters that apply to debugging or COBOL