

## מבוא ל MF ו- JCL

**Duration: 5 DAYS**

***This course is essential for all those working in technical roles within a z/OS environment. The course teaches the coding of job control statements to execute programs and access datasets, as well as how to write and test catalogued procedures.***

***The course combines classroom tuition with practical exercises using various IBM utilities.***

***Regularly upgraded to reflect recent developments in z/OS, the practical sessions of this course now comprise almost 40% of the course timetable!***

### **Contents**

#### **z/OS: Structure & Components**

z/OS background and history; MVS main memory and virtual storage; MVS versions; Address space layout; Common area; Private area; Main components of z/OS; z/OS processing environments: On-line, TSO, ISPF, Batch; MVS spooling; Other program products and their functions.

*This segment gives a brief overview of z/OS.*

#### **Introduction to z/OS Job Control Language**

Basic job structure; Job stream processing; JCL output; JCL statement types; JCL statement format and coding rules; JES2 control statements; JES3 control statements; JCL error points. *Describes jobs and job steps, introduces rules for coding JCL statements and explains the role that JES has in job submission and execution.*

#### **The JOB Statement**

The JOB statement overview; Accounting information - positional; Programmer's name - positional; Keyword parameters; Other keyword parameters; Example JOB statements.

*This segment distinguishes between positional and keyword parameters. It also explains the more common JOB statement parameters.*

#### **The EXEC Statement**

The EXEC statement; EXEC format - program; EXEC format - procedure; EXEC keyword parameters; Other EXEC keyword parameters; COND parameter; EVEN or ONLY; Example EXEC statements; EXEC statement summary.

*Covers the differences between executing a program and a procedure. Parameters used when a program is executed are explained.*

#### **Printing & In-stream Data**

Print files & In-stream data; Printing: Examples, DEST, COPIES, DCB; Output statement; OUTPUT statement: Implicit, Explicit, Multiple output; Output statement parameters; Examples; OUTDISP parameter; In-stream data.

*JES's handling of print output (which output queue the print output will go to, etc), plus the use of in-stream data.*

#### **The DD Statement**

The DD statement; DD parameters: DSN, DISP, UNIT and VOL; SMS considerations; DD statement summary: Existing catalogued dataset, Existing non-catalogued dataset.

*Describes the JCL needed for existing datasets. The importance of cataloguing datasets is emphasized*

## **The DD Statement - Working with Datasets**

Dataset types; Sequential datasets; Partitioned Data Sets; VSAM datasets; BUFNO; Accessing existing datasets; Creating new non-VSAM datasets; Data Control Block parameters; SPACE parameter; Space allocation DSCBs; System Managed Storage: Disk datasets with SMS, Space allocation with SMS. DCB parameters with SMS; Creating VSAM datasets in JCL; Generation datasets; SMS GDG considerations; Stages in creating a generation dataset; Tape datasets; LABEL parameter; DD statement summary; Creating a new dataset on disk - non-SMS; Creating a new tape dataset.

*This segment describes the JCL needed to create new datasets, either on DASD, or cartridge. An explanation of generation datasets and the JCL needed to use them is included in this segment, along with details of the new parameters available if SMS is used.*

## **Further DD Considerations**

Special ddnames; JOBLIB; STEPLIB; Dump datasets; Concatenated datasets; Temporary dataset names; Dummy datasets.

*The remaining uses of the DD statement, with emphasis on DD names for libraries, dump, concatenated and temporary datasets.*

## **Procedures**

JCL procedures; In-stream procedures; What a catalogued procedure cannot contain; Cataloguing a procedure; INCLUDE statement; Calling a procedure; Symbolic parameters; Examples of symbolic translation; Default parameters; Resolving symbolic parameters; SET statement; Modifying EXEC statement parameters; Modifying DD parameters; Concatenated data sets; Adding DD statements; Substitution prefixes; Using a standard COBOL compile/link/go procedure.

*Catalogued procedures are widely used in z/OS. This segment deals with all aspects of them, including creating, testing and modification.*

## **Conditional JCL Statements**

The general construct; Name field; Relational-expression field; Relational-expression keywords; Comparison operators; Logical operators; NOT operator; Order of priority of operators; Parentheses; THEN and ELSE clauses; Contents of THEN and ELSE clauses; IF/THEN/ELSE/ENDIF and COND.

*This is the IBM recommended way of coding conditional JCL. All aspects of the IF, THEN, ELSE construct are explained.*

Common MVS Abend Codes

Problem handling; Program abends; Common MVS completion codes.

## **z/OS JCL Review**

Introduction; Structure of a job; Job processing in z/OS; JOB output; JCL statement types; JCL statement format and coding rules; JCL operand types: Positional parameters, Keyword parameters, Sub-parameters; JCL summary; JCL error points.

## **JES Control Statements**

Introduction; Why have a Job Entry Sub-system?; JES historical requirements; JES2 versus JES3; JES2 processing overview; JES3 processing overview; Placement of JES2 statements; JES2 statement types; JES2 statement syntax; JES2 command statements.

## **JCL Command Processing**

Introduction; Command authorisation; Internal Reader controls; z/OS command authorisation; z/OS command disposition; JES2 commands; z/OS commands; z/OS command groups: INFO, I/O, CONS, MASTER, SYS; COMMAND statement; Sample exploitation; JES2 Command and Internal Reader.

## **Remote Batch Execution**

Introduction; Local versus Remote definition; Local processing; Remote processing (Remote Job Entry - RJE); Remote processing (Network Job Entry - NJE); Sysplex; JES2 control statements: /\*XEQ, /\*ROUTE XEQ, /\*ROUTE, /\*XMIT; Security and Remote Job Execution; RACF overview; Propagation or not; JOB statement parameters.

*This segment gives a brief overview of RJE and covers the security aspects of remote job submission.*

## **Output Processing**

Introduction; Positioning on a page; Control characters; Forms Control Block; Impact of JOB statement on output processing; Accounting Information; JOB statement keywords; JES2 statements: /\*JOBPARM; /\*OUTPUT, /\*ROUTE; DD statement keywords; DCB parameter and output processing; OUTPUT statement; Implicit statements; Explicit statements; OUTPUT statement parameters; Output routing; Using DEST on the DD statement; Using multiple OUTPUT statements; Printing before JOB end; Setting output defaults; Output processing options.

## **Partitioned Data Set Extended (PDSE)**

Introduction; 6.2 What is a PDS?; PDS disadvantages; What is a PDSE?; What are the advantages of a PDSE?; Types of PDSE; PDSE and BLKSIZE; PDSE concatenation; PDSE processing restrictions; Allocating a PDSE - IDCAMS; Allocating a PDSE via JCL; Migrating load modules to program objects.

*This segment describes how to create PDSE, and HFS files. It also describes how to create VSAM datasets directly, without IDCAMS.*

## **z/OS DFP Utilities**

What is a utility program?; Data Facility Product (DFP); DFP Utilities; DFP - system utilities; General overview; Standard DD statements; IEHINITT; IEHINITT control statement; IEHLIST; IEHMOVE; IEHPROGM; IFHSTATR; DFP - Data Set Utilities; General overview; Standard DD statements; IEBCOMPR; IEBCOPY; COPY operation; Partial copy; IEBDG; DSD statement; FD statement; REPEAT statement; CREATE statement; IEBEDIT; IEBGENER and ICEGENER; IEBIMAGE; IEBISAM; IEBPTPCH; IEBUPDTE; Access Method Services - IDCAMS.

*Covers the usage of the various utilities, including when they may be required instead of using TSO/E functions.*

## **z/OS DFSMSdss**

Introduction; Positioning DFSMSdss; Dataset compression; Defragmentation; Full volume dumping; Partial volume dumping; Restoring; Migrating program objects.

## **Advanced Catalogued Procedures**

Introduction; Why JCL procedures; What and where is a procedure library?; Procedure specific JCL statements; JCLLIB statement; Order of search; 9.4.1.2 Security and 24 by 7 implications; Statements: PROC, PEND, INCLUDE, SET; Sample procedure; Started jobs; Benefits of procedures today.

*Describes the concept of nested procedures and how they are coded. It offers an approach to using the INCLUDE statement to ease JCL maintenance and improve support staff productivity. It also describes how the SET statement can be used to resolve job wide variables and explores the process of starting jobs and procedures via a start command.*

## **DFSORT**

Introduction; Data Facility/Sort; How Sort works; Sort phases; Control fields; Sort operation; Control statements; JCL requirements; Messages; Syntax; Sort fields specification; MERGE field specification; MODS specification; INCLUDE/OMIT specification; RECORD specification; OUTFIL specification; ALTSEQ specification; OUTREC specification; SUM specification; OPTION specification; Common format codes for control fields.

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## **Introduction to ICETOOL**

What does ICETOOL do ?; ICETOOL job format; Operator statement syntax; Comment statements; Return Codes.

## **ICETOOL Operators**

Syntax, Function and Examples of ICETOOL Operators: COPY; COUNT; DATASORT; DEFAULTS; DISPLAY; MERGE; MODE; OCCUR; RANGE; RESIZE; SELECT; SORT; SPLICE; STATS; SUBSET; UNIQUE; VERIFY.

## **Invoking ICETOOL**

Invoking ICETOOL directly; JCL requirements; Return Codes; Messages; Invoking ICETOOL from a program; TOOLIN interface; Parameter list interface; Explanation of fields; Statement Area Address and Statement Area; Return Area Address and Return Area; Examples.

## **Using Symbols for Fields and Constants**

Field and Constant Symbols Overview; DFSORT Example; SYMNAMES DD statement; SYMNAMES statements; SYMNOUT DD statement; using symbols on DFSORT statements; using symbols on ICETOOL statements.