

Introduction to the new mainframe

Chapter 6: Using Job Control Language (JCL) and System Display and Search Facility (SDSF)



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Chapter 6 objectives

Be able to:

- Explain how JCL works with the system, give an overview of JCL coding techniques, and know a few of the more important statements and keywords
- Create a simple job and submit it for execution
- Check the output of your job through SDSF





Key terms in this chapter

- concatenation
- DD statement
- Job Control Language (JCL)
- JOB statement
- EXEC statement
- job name
- procedure (PROC)

- record format (RECFM)
- system display and search facility (SDSF)
- step name
- system catalog
- system library
- utility



What is JCL?

Job control language (JCL) tells the system what program to execute and provides a description of program inputs and outputs.

There are three basic JCL statements:

- JOB statement
- EXEC statement
- DD statement



Basic JCL coding syntax

JCL must be uppercase





JCL example

- //MYJOB JOB 1,MSGCLASS=T
- //MYSORT EXEC PGM=SORT
- //SORTIN DD DISP=SHR, DSN=IBMUSER.AREA.CODES
- //SORTOUT DD SYSOUT=*
- //SYSOUT DD SYSOUT=*
- //SYSIN DD *

```
SORT FIELDS=(1,3,CH,A)
```

/*



In the preceding example...

- MYJOB Job name
- MYSORT Step name
- **SORTIN** DD name for program input
- **SORTOUT** DD name for program output
- SYSOUT Where to send system output messages (such as a data set)
- SYSIN Specifies whether the input will be data or control statements.



JCL: JOB statement

- Create a member using ISPF edit
- Create JCL statements
 - > JOB statement
 - Accounting information
 - Execution classes

```
MIRIAM.PRIVATE.JCLLIB(JOB1) - 01.05
EDIT
                                         Columns 00001 00072
Command ===> ____
                                         Scroll ===> HALF
000001 //MIRIAM2 JOB 19, MIRIAM, NOTIFY=&SYSUID, MSGCLASS=T,
000002 // MSGLEVEL=(1,1),CLASS=A
000003 //STEP1 EXEC PGM=IEFBR14
000004 //*-----
000005 //* THIS IS AN EXAMPLE OF A NEW DATA SET ALLOCATION
000006 //*-----
                                ----*
000007 //NEWDD DD DSN=MIRIAM.IEFBR14.TEST.NEWDD.
             DISP=(NEW, CATLG, DELETE), UNIT=SYSDA,
000008 //
              SPACE=(CYL, (10, 10, 45)), LRECL=80, BLKSIZE=3120
000009 //
```



JCL: EXEC statement

EXEC statement

> Region size

MIRIAM.PRIVATE.JCLLIB(JOB1) - 01.05 Columns 00001 00072 EDIT Command ===> Scroll ===> HALF 000001 //MIRIAM2 JOB 19, MIRIAM, NOTIFY=&SYSUID, MSGCLASS=T, 000002 // MSGLEVEL=(1,1),CLASS=A 000003 //STEP1 EXEC PGM=IEFBR14 000004 //*-----** 000005 //* THIS IS AN EXAMPLE OF A NEW DATA SET ALLOCATION 000006 //*-----* 000007 //NEWDD DD DSN=MIRIAM.IEFBR14.TEST.NEWDD, DISP=(NEW, CATLG, DELETE), UNIT=SYSDA, 000008 // 000009 // SPACE=(CYL, (10, 10, 45)), LRECL=80, BLKSIZE=3120



JCL: DD statement

DD statement

- > DD name (referenced in the program)
- > DSN= (the data set name as cataloged on disk)

EDIT	MIRIAM.P	'RIVATE.JCLLIB(JOB1) - 01.05	Columns 00001 00072						
Command	===> <u> </u>		Scroll ===> <u>HALF</u>						
*****	*******	жжжжжжжжжжжжжжж Тор of Data жжжжжжжжж	******						
000001	000001 //MIRIAM2 JOB 19,MIRIAM,NOTIFY=&SYSUID,MSGCLASS=T,								
000002	000002 // MSGLEVEL=(1,1),CLASS=A								
000003	//STEP1 EXEC	; PGM=IEFBR14							
000004	//*		- *						
000005	//* THIS IS	AN EXAMPLE OF A NEW DATA SET ALLOCATION							
000006	//*		- *						
000007	//NEWDD DD	DSN=MIRIAM.IEFBR14.TEST.NEWDD,							
000008	11	DISP=(NEW,CATLG,DELETE),UNIT=SYSDA,							
000009	11	SPACE=(CYL,(10,10,45)),LRECL=80,BLKSIZE	E=3120						
*****	******	**************************************	*******						



Specifying a data set disposition:

DISP is an operand of the DD statement

- DISP indicates what to do with the data set (the disposition) at step start, end, or abnormal end (if the job fails)
- DISP helps to prevent unwanted simultaneous access to data sets, which is very important for general system operation.



Uses of the DISP= operand

```
DISP=(status,normal end,abnormal end)
DISP=(status,normal end)
DISP=status
```

where status can be

- NEW
- OLD
- SHR
- MOD



Creating a new data set

New data sets can be created through JCL by using the DISP=NEW parameter.

For a DISP=NEW request, you need to supply more information, including:

- A data set name, DSN=
- The type of device for the data set, UNIT=sysda
- If a disk is used, the amount of space to be allocated for the primary extent must be specified, SPACE=
- If it is a partitioned data set, the size of the directory must be specified within the SPACE parameter
- Optionally, DCB parameters can be specified.



Continuation and concatenation

Needed to overcome the limitations of the 80-column punched cards used in earlier systems.

- Continuation allows a JCL statement to span multiple records.
- Concatenation allows a single ddname to have multiple DD statements.



Continuation and concatenation (example)

Continuation example

//JOBCARD JOB 1,
// REGION=8M,
// NOTIFY=IBMUSER

Concatenation example

//DATAIN DD DISP=OLD,DSN=MY.INPUT1

- // DD DISP=OLD, DSN=MY.INPUT2
- // DD DISP=SHR,DSN=YOUR.DATA



JCL procedures - example

- //MYJOB JOB 1
- //MYPROC PROC
- //MYSORT EXEC PGM=SORT
- //SORTIN DD DISP=SHR,DSN=&SORTDSN
- //SORTOUT DD SYSOUT=*
- //SYSOUT DD SYSOUT=*

PEND

11



JCL procedures (continued)

//MYJOB	JOB 1
//*	*
//MYPROC	PROC
//MYSORT	EXEC PGM=SORT
//SORTIN	DD DISP=SHR,DSN=&SORTDSN
//SORTOUT	DD SYSOUT=*
//SYSOUT	DD SYSOUT=*
//	PEND
//*	*
//STEP1	EXEC MYPROC, SORTDSN=IBMUSER.AREA.CODES
//SYSIN	DD *
SORT FIEI	DS=(1,3,CH,A)



JCL procedure	es statement override
//MYJOB	JOB 1
//*	*
//MYPROC	PROC
//MYSORT	EXEC PGM=SORT
//SORTIN	DD DISP=SHR, DSN=&SORTDSN
//SORTOUT	DD SYSOUT=*
//SYSOUT	DD SYSOUT=*
//	PEND
//*	*
//STEP1	EXEC MYPROC, SORTDSN=IBMUSER.AREA.CODES
//MYSORT.SO	RTOUT DD DSN=IBMUSER.MYSORT.OUTPUT,
//	<pre>DISP=(NEW,CATLG),SPACE=(CYL,(1,1)),</pre>
//	UNIT=SYSDA, VOL=SER=SHARED,
//	<pre>DCB=(LRECL=20,BLKSIZE=0,RECFM=FB,DSORG=PS)</pre>
//SYSIN	DD *
SORT FIEL	DS=(1,3,CH,A)



Using SDSF

After submitting a job, z/OS users use System Display and Search Facility (SDSF) to review the job output for successful completion or JCL errors.

SDSF allows users to:

- View and search the system log
- Enter system commands
- Hold, release, cancel, and purge jobs
- Monitor jobs while they are processed
- Display job output before deciding to print it
- Control the order in which jobs are processed
- Control the order in which output is printed
- Control printers and initiators







SDSF: Primary option menu

<u>D</u> isplay <u>F</u> ilter <u>V</u> iew <u>P</u> rint <u>O</u> ptions <u>S</u> earch <u>H</u> elp							
HQX7770 SDSF PRIMARY COMMAND INPUT ===> _	OPTIO	N MENU	SCROLL ===> PAGE				
DA Active users	INIT	Initiators					
I Input queue	PR	Printers					
0 Output queue	PUN	Punches					
H Held output queue	RDR	Readers					
ST Status of jobs	LINE	Lines					
	NODE	Nodes					
LOG System log	SO	Spool offload					
SR System requests	SP	Spool volumes					
MAS Members in the MAS							
JC Job classes	RM	Resource monitor					
SE Scheduling environments	СК	Health checker					
RES WLM resources							
Licensed Materials - Property of IBM							
5694-A01 Copyright IBM Corp. 1981, 2010	. All	rights reserved.					
US Government Users Restricted Rights -	Use,	duplication or					
F1=HELP F2=SPLIT F3=END	F4=RE	TURN F5=IFIND	F6=B00K				
F7=UP F8=DOWN F9=SWAP	F10=LE	FT F11=RIGHT	F12=RETRIEVE				
MAA			04/021				



SDSF: Options menu

Display Filter View Print	Options Search Help					
HQX7770 SD COMMAND INPUT ===>	1. Set action character display 2. Find limit					
	3. Change include SYSIN to ON					
DA Active users	4. Set bookshelf					
I Input queue	5. Set display values to ON					
0 Output queue	6. Set screen characteristics					
H Held output queue	7. Set delay for responses					
ST Status of jobs	8. Set communications timeout					
	9. Set console name					
LOG System log	10. Set search characters					
SR System requests	11. Assign PF keys					
MAS Members in the MAS	12. Change show PF keys to OFF					
JC Job classes	13. Set language for help and tutorial					
SE Scheduling environments	14. Set cursor option					
RES WLM resources	15. Set confirmation to ON					
	16. Operlog limit for filter					
Licensed Materials - Property	17. Set date format					
	18. Set log default					
5694-A01 Copyright IBM Corp.	19. Set default browse action					
US Government Users Restricte	20. Set default check history limit					
F1=HELP F2=SPLIT F3 ^I						
F7=UP F8=DOWN F9=S	SWAP F10=LEFT F11=RIGHT F12=RETRIEVE					
M <u>A</u> A	03/034					



Viewing the JES2 output files

Screen 1

<u>D</u>isplay <u>Eilter View Print Options H</u>elp SDSF HELD OUTPUT DISPLAY ALL CLASSES LINES 44 LINE 1-1 (1) COMMAND INPUT ===> SCROLL ===> PAGE PREFIX=* DEST=(ALL) OWNER=* SYSNAME= NP JOBNAME JobID Owner Prty C ODisp Dest Tot-Rec Tot-?_ MIRIAM2 JOB26044 MIRIAM 144 T HOLD LOCAL 44

Screen 2

Display Filter View Print Options Help SDSF JOB DATA SET DISPLAY - JOB MIRIAM2 (JOB26044) LINE 1-3 (3) COMMAND INPUT ===> SCROLL ===> PAGE PREFIX=* DEST=(ALL) OWNER=* SYSNAME= DDNAME StepName ProcStep DSID Owner NP C Dest Rec-Cnt Page JESMSGLG JES2 2 MIRIAM T LOCAL 20 JESJCL JES2 3 MIRIAM T LOCAL 12 JESYSMSG JES2 4 MIRIAM T LOCAL 12



SDSF: Display active users (DA)

<u>D</u> isplay <u>F</u> i	lter <u>V</u> ieu	√ <u>P</u> rint	<u>O</u> ptions	<u>S</u> earch	<u>H</u> e	lp				
SDSF DA SC80	SC80	PAG	0 CPU/L/	Z 3/	3/	0	LINE	35-!	51 (76)	
COMMAND INPUT	===>							S	CROLL ==	=> PAGE
NP JOBNAME	StepName	ProcStep	JobID	Owner	С	Pos	DP	Real	Paging	SIO
IOSAS	IOSAS	IEFPROC				NS	FF	27T	0.00	0.00
IXGLOGR	IXGLOGR	IEFPROC				NS	FF	8451	0.00	0.00
JESXCF	JESXCF	IEFPROC				NS	FF	682	0.00	0.00
JES2	JES2	IEFPROC				NS	FE	8452	0.00	4.43
JES2AUX	JES2AUX					NS	FE	206	0.00	0.00
JES2MON	JES2MON	IEFPROC				NS	FF	637	0.00	0.00
JES2S001	JES2S001	IEFPROC				NS	FE	577	0.00	0.00
LLA	LLA	LLA				NS	FE	4077	0.00	0.00
LUTZ	IKJACCNT	SC38TC99	TSU01214	LUTZ		ΙN	FE	1560	0.00	0.00
NET	NET	NET				NS	FE	2985	0.00	0.00
OMVS	OMVS	OMVS				NS	FF	15T	0.00	0.00
OPTSO	OPTSO	OPTSO	STC00119	IBMUSEF	2	LO	FF	421	0.00	0.00
PCAUTH	PCAUTH					NS	FF	210	0.00	0.00
PFA	PFA	PFA	STC00242	PFA		ΙN	FE	1519	1.48	10.33
PORTMAP	PORTMAP	PORTMAP	STC00254	TCPIP		LO	FF	405	0.00	0.00
RACF	RACF	RACF	STC00266	RACF		NS	FE	568	0.00	0.00
RASP	RASP					NS	FF	466	0.00	0.00
F1=HELP	F2=SPLIT	F3=E	ND	F4=RETUF	RN	F5	=IFI	ND	F6=B0	OK
F7=UP	F8=D0WN	F9=S	WAP F	10=LEFT		F11	=RIC	ЪНТ	F12=RE	TRIEVE
MA A										04/021



Issuing MVS and JES commands

```
Display Filter View Print Options Help
H0X7707 ----- SDSF PRIMARY OPTION MENU -- PARM INVALID
COMMAND INPUT ===> /SET PROG+
                                                    SCROLL ===> PAGE
DA
                      System Command Extension
Ι
0
    Type or complete typing a system command, then press Enter.
н
ST
    ===> SET PROG
    ===>
LO
    Place the cursor on a command and press Enter to retrieve it.
SR
MA
                                                    More:
                                                             +
JC
    = D T
SE
    => CANCEL U=ORSI
RE
    => SET PROG
    =>
EN
PS.
    =>
    =>
    =>
EN
    = \Sigma
            F2=Split F3=Cancel F5=FullScr F7=Backward
    F1=Help
    F8=Forward F9=Swap F11=ClearLst F12=Cancel
```



SDSF: Input queue panel

<u>D</u> isplay]	Eilter <u>V</u> i	iew <u>P</u> rint	<u>O</u> ptions	<u>H</u> elp		
SDSF INPUT	QUEUE DISF	PLAY ALL C	LASSES		LINE 1-7 (7)	26
	$FST = (\Delta I I)$		SVSNOME-		SCROLE/ FHC) [
			Detu C	Boc BetDoct	Dat Nodo S	20 F
NP JUDNHM		Uwiter	PILY C	PUS FILDESL	KIIIT NOUE S	ЯПІ
BHRIRI	DR 1080041	2 BHRIRI	10 A	LUCHL	1	
BARTR1	DB JOB0647	79 BARTR1	10 A	LOCAL	1	
BARTR1	DB J080656	51 BARTR1	10 A	LOCAL	1	
BARTR1	DB J0B0656	55 BARTR1	10 A	LOCAL	1	
BARTR1	DB J0B0656	58 BARTR1	10 A	LOCAL	1	
BARTR1	DB J0B0658	38 BARTR1	10 A	LOCAL	1	
BARTTE	P1 J0B0913	38 BART	10 A	LOCAL	1 9	3C6

F1=HELP F7=UP F2=SPLIT F8=DOWN F3=END F9=SWAP F4=RETURN F10=LEFT

F5=IFIND F11=RIGHT F6=B00K F12=RETRIEVE



SDSF: Output queue panel

<u>D</u> isplay <u>F</u> i	lter <u>V</u> iew	√ <u>P</u> rint	<u>O</u> ptio	ons	s <u>H</u> el	р		
SDSF OUTPUT A	LL CLASSES	S ALL FO	RMS	1	INES	304,174	LINE 1-24	(266)
COMMAND INPUT	===>						SCI	ROLL ===> PAGE
PREFIX=* DES	Γ=(ALL) (DWNER=*	SYSNAM	1E=	=			
NP JOBNAME	JobID	Owner	Prty	С	Forms	Dest		Tot-Rec
RMF	STC16499	STC	144	A	STD	LOCAL		
JJONESDB	J0B17936	JJONES	144	A	STD	LOCAL		34
JJONESDB	J0B17937	JJONES	144	A	STD	LOCAL		145
RMF	STC17097	STC	144	A	STD	LOCAL		
RMF	STC18679	STC	144	Α	STD	LOCAL		
RMF	STC13665	STC	144	Α	STD	LOCAL		
LUTZ	TSU20005	LUTZ	144	Α	STD	LOCAL		24
LUTZ	TSU20206	LUTZ	144	A	STD	LOCAL		24
LUTZ	TSU20555	LUTZ	144	A	STD	LOCAL		24
ARS01X	J0B20692	TWSRES1	144	A	STD	LOCAL		29
ARS01X	J0B20693	TWSRES1	144	A	STD	LOCAL		29
ARS01X	J0B20717	TWSRES1	144	A	STD	LOCAL		29
LDAPKI	STC19980	LDAPKI	144	A	STD	LOCAL		54
RMF	STC19444	STC	144	A	STD	LOCAL		
HSM	STC21908	STC	144	A	STD	LOCAL		19
HSM	STC21908	STC	144	A	STD	LOCAL		18
HSM	STC21908	STC	144	A	STD	LOCAL		19
HSM	STC21908	STC	144	Α	STD	LOCAL		19
HSM	STC21908	STC	144	A	STD	LOCAL		2
HSM	STC21908	STC	144	A	STD	LOCAL		2
HSM	STC21908	STC	144	Α	STD	LOCAL		2
TWS	J0B22149	VBUDI	144	Α	STD	LOCAL		354
TWS	J0B22151	VBUDI	144	A	STD	LOCAL		375
TWS	J0B22153	VBUDI	144	Ĥ	STD	LOCAL		101
F1=HELP	F2=SPLIT	F3=I	END		F4=R	ETURN F	5=IFIND	F6=B00K
F7=UP	F8=D0WN	F9=\$	SWAP		F10=L	EFT F1	1=RIGHT	F12=RETRIEVE



SDSF: Held output queue panel

<u>D</u> isplay <u>F</u> i	ilter <u>V</u> iew	<u>P</u> rint <u>O</u> pti	ons <u>H</u> elp	0		
SDSF HELD OUT	PUT DISPLAY	ALL CLASSES	LINES	194	LINE 1-6 (6)	
COMMAND INPUT	[===> <u> </u>				SCROLL ===>	PAGE
PREFIX=* DES	ST=(ALL) OW	INER=* SYSNA	ME=			
NP JOBNAME	JobID C)wner Prty	C ODisp	Dest	Tot-Rec	Tot-
MIRIAM2	JOB26044 M	1IRIAM 144	T HOLD	LOCAL	44	
MIRIAM2	J0B26069 №	1IRIAM 144	T HOLD	LOCAL	30	
MIRIAM3	J0B26070 №	1IRIAM 144	T HOLD	LOCAL	30	
MIRIAM4	J0B26071 №	1IRIAM 144	T HOLD	LOCAL	30	
MIRIAM5	J0B26072 №	1IRIAM 144	T HOLD	LOCAL	30	
MIRIAM6	J0B26073 №	1IRIAM 144	T HOLD	LOCAL	30	

F1=HELP	F2=SPLIT	F3=END	F4=RETURN	F5=IFIND	F6=B00K
F7=UP	F8=D0WN	F9=SWAP	F10=LEFT	F11=RIGHT	F12=RETRIEVE



SDSF: Status panel

<u>D</u> 1	<u>D</u> isplay <u>F</u> ilter <u>V</u> iew <u>P</u> rint <u>O</u> ptions <u>H</u> elp								
SDSF	SDSF STATUS DISPLAY ALL CLASSES LINE 1-24 (3281)								
COMM	AND INPUT	===>		SCROLL ===> PAGE					
PREF	IX=* DEST	[=(ALL) (DWNER=*	SYSNAM	1E=				
NP	JOBNAME	JobID	0wner	Prty	Queue	С	Pos SAff	ASys Status	
	BARTR1DB	J0B06472	BARTR1	10	EXECUTION	A		HOLD	
	BARTR1DB	J0B06479	BARTR1	10	EXECUTION	A		HOLD	
	BARTR1DB	J0B06561	BARTR1	10	EXECUTION	A		HOLD	
	BARTR1DB	J0B06565	BARTR1	10	EXECUTION	A		HOLD	
	BARTR1DB	J0B06568	BARTR1	10	EXECUTION	A		HOLD	
	BARTR1DB	J0B06588	BARTR1	10	EXECUTION	A		HOLD	
	BARTTEP1	J0B09138	BART	10	EXECUTION	A	SC63	HOLD	
	TWSSTD3	TSU26002	TWSSTD3	15	EXECUTION		SC64	SC64	
	KMT 1	TSU26024	KMT 1	15	EXECUTION		SC64	SC64	
	MIRIAM	TSU26043	MIRIAM	15	EXECUTION		SC64	SC64	
	HAIMO	TSU26050	HAIMO	15	EXECUTION		SC63	SC63	
	BARTR4	TSU26051	BARTR4	15	EXECUTION		SC63	SC63	
	RAVI	TSU26052	RAVI	15	EXECUTION		SC63	SC63	
	BARTR2	TSU26060	BARTR2	15	EXECUTION		SC63	SC63	
	VBUDI	TSU26062	VBUDI	15	EXECUTION		SC64	SC64	
	SYSLOG	STC24863	+MASTER+	15	EXECUTION		SC63	SC63	
	RACF	STC24871	RACF	15	EXECUTION		SC63	SC63	
	SYSLOG	STC24931	+MASTER+	15	EXECUTION		SC64	SC64	
	RACF	STC24941	RACF	15	EXECUTION		SC64	SC64	
	OPTSO	STC24857	STC	15	EXECUTION		SC63	SC63	
	OAM	STC24858	STC	15	EXECUTION		SC63	SC63	
	RMF	STC24855	STC	15	EXECUTION		SC63	SC63	
	SDSF	STC24862	STC	15	EXECUTION		SC63	SC63 ARMELEM	
	ASCHINT	STC24867	STC	15	EXECUTION		SC63	SC63	
F1=	HELP	F2=SPLIT	F3=El	ND	F4=RETU	RN	F5=IFIND	F6=B00K	
F7=	UP	F8=D0WN	F9=SI	AU AU	F10=LEFT		F11=RIGHT	F12=RETRIEVE	



Utilities

- z/OS includes a number of programs useful in batch processing called utilities.
- Utilities provide many small, obvious, and useful functions.
- A basic set of system-provided utilities is described in the textbook (Appendix C).
- Customer sites often write their own utility programs, many of which are shared by the z/OS user community.
- Some examples of utilities:
 - IEBGENER
 IEBCOPY
 IDCAMS
 Copies a sequential data set
 Works with VSAM data sets



System Libraries

z/OS has many standard system libraries, including:

- SYS1.PROCLIB JCL procedures distributed with z/OS
- SYS1.PARMLIB Control parameters for z/OS and some program products.
- SYS1.LINKLIB Many of the basic execution modules of the system.
- SYS1.LPALIB System execution modules that are loaded into the link pack area at z/OS initialization.



Summary

- Basic JCL contains three statements: JOB, EXEC, and DD.
- A program can access different groups of data sets in different jobs by changing the JCL for each job.
- New data sets can be created through JCL by using the DISP=NEW parameter.
- Users normally use JCL procedures for more complex jobs. A cataloged procedure is written once and can then be used by many users.
- z/OS supplies many JCL procedures, and locally-written ones can be added easily.
- A user must understand how to override or extend statements in a JCL procedure to supply the parameters (usually DD statements) needed for a specific job.



Summary - continued

- SDSF is a panel interface for viewing the system log and the list of active users and controlling and monitoring jobs and resources.
- Utility programs make operating on data sets easier
- System libraries contain JCL procedures, control parameters, and system execution modules.