




**Uni Hamburg – Mainframe Summit
z/OS – The Mainframe Operating**

Anhang 1 – JCL und SDSF

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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




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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

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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

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Basic JCL coding syntax

JCL must be uppercase

Forward slash in column 1 and 2

Name (1-8 characters) follow the slashes

Space separators

```
//JOBNAME JOB
//STEPNAME EXEC
//DDNAME DD
/* comment - upper or lower case
/* ....end of JCL stream
```

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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)
/*
```

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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.

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JCL: JOB statement

- ❑ Create a member using ISPF edit
- ❑ Create JCL statements
 - **JOB statement** ←
 - Accounting information
 - Execution classes

```
EDIT      MIRIAM.PRIVATE.JCLLIB(JOB1) - 01.05      Columns 00001 00072
Command ==> _____ Scroll ==> HBLE
***** Top of Data *****
000001 //MIRIAM2 JOB 19,MIRIAM,NOTIFY=8SYSUID,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,
000008 //          DISP=(NEW,CATLG,DELETE),UNIT=SYSDA,
000009 //          SPACE=(CYL,(10,10,45)),LRECL=80,BLKSIZE=3120
***** Bottom of Data *****
```

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JCL: EXEC statement

- ❑ **EXEC statement** ←
- Region size

```
EDIT      MIRIAM.PRIVATE.JCLLIB(JOB1) - 01.05      Columns 00001 00072
Command ==> _____ Scroll ==> HBLE
***** Top of Data *****
000001 //MIRIAM2 JOB 19,MIRIAM,NOTIFY=8SYSUID,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,
000008 //          DISP=(NEW,CATLG,DELETE),UNIT=SYSDA,
000009 //          SPACE=(CYL,(10,10,45)),LRECL=80,BLKSIZE=3120
***** Bottom of Data *****
```

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JCL: DD statement

- ❑ **DD statement** ←
- DD name (referenced in the program)
- DSN= (the data set name as cataloged on disk)

```
EDIT      MIRIAM.PRIVATE.JCLLIB(JOB1) - 01.05      Columns 00001 00072
Command ==> _____ Scroll ==> HBLE
***** Top of Data *****
000001 //MIRIAM2 JOB 19,MIRIAM,NOTIFY=8SYSUID,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,
000008 //          DISP=(NEW,CATLG,DELETE),UNIT=SYSDA,
000009 //          SPACE=(CYL,(10,10,45)),LRECL=80,BLKSIZE=3120
***** Bottom of Data *****
```


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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.

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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

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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.

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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.

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Continuation and concatenation (example)


Continuation example

```
//JOB CARD JOB 1,
//          REGION=8M,
//          NOTIFY=IBMUSER
```

Concatenation example

```
//DATA IN DD DISP=OLD, DSN=MY.INPUT1
//          DD DISP=OLD, DSN=MY.INPUT2
//          DD DISP=SHR, DSN=YOUR.DATA
```


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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
```

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

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JCL procedures -- 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=IBMUUSER.AREA.CODES
//MYSORT.SORTOUT DD DSN=IBMUUSER.MYSORT.OUTPUT,
// DISP=(NEW,CATLG),SPACE=(CYL,(1,1)),
// UNIT=SYSDA,VOL=SER=SHARED,
// DCB=(LRECL=20,BLKSIZE=0,RECFM=FB,DSORG=PS)
//SYSIN DD *
SORT FIELDS=(1,3,CH,A)
  
```

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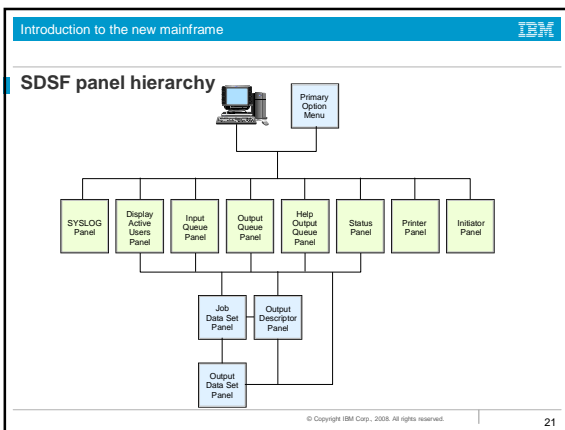
Using SDSF

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

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SDSF: Primary option menu

```

Display Filter View Print Options Help
-----
ISPF0041 ----- SDSF PRIMARY OPTION MENU
COMMAND INPUT ----> SCROLL ----> PAGE
DA Active users          INIT Initiators
I  Input queue          PR  Printers
O  Output queue         PIN  Punches
H  Held output queue    RDR  Readers
ST Status of jobs       LINE Lines
LOG System log         NODE Nodes
SR System requests     SP  Spool offload
MMS Members in the MMS  S0  Spool volumes
JC Job classes         ULOG User session log
SE Scheduling environments
RES WLM resources
ENC Enclaves
PS Processes
END Exit SDSF

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

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SDSF: Options menu

```

Display Filter View Print Options Help
-----
H0K7F07 ----- SD
COMMAND INPUT ---->
DA Active users
I  Input queue
O  Output queue
H  Held output queue
ST Status of jobs
LOG System log
SR System requests
MMS Members in the MMS
JC Job classes
SE Scheduling environments
RES WLM resources
ENC Enclaves
PS Processes
END Exit SDSF

1. Set action character display...
2. Find limit...
3. Change include SYSIN to ON
4. Set bookshelf
5. Set display values to OFF
6. Set screen characteristics...
7. Set delay for responses...
8. Set communications timeout...
9. Set console name...
10. Set search characters...
11. Assign PF keys...
12. Change show PF keys to OFF
13. Set language for help and tutorial...
14. Set cursor to OFF
15. Set confirmation to OFF
16. Openlog limit for filter...
17. Set date format...
18. Set log default...

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

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Viewing the JES2 output files

Screen 1

```

Display Filter View Print Options Help
-----
SDSF HELD OUTPUT DISPLAY ALL CLASSES LINES 44 LINE 1-1 (1)
COMMAND INPUT ----> SCROLL ----> PAGE
PREFIX= DESI=ALL) OWNER=* SYSNAME=
NP JOBNAM 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 DRAIN SET DISPLAY = JOB MIRIAM2 (JOB26044) LINE 1-3 (3)
COMMAND INPUT ----> SCROLL ----> PAGE
PREFIX=* DESI=(ALL) OWNER=* SYSNAME=
NP DNAME StepName ProcStep DSDD Owner C Dest Rec-Cnt Page
JESMSGLG JES2 2 MIRIAM 1 LOCAL 20
JESJCL JES2 3 MIRIAM 1 LOCAL 12
JESYSMSG JES2 4 MIRIAM 1 LOCAL 12
  
```

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SDSF: Display active users (DA)

Display Filter View Print Options Help

```
SDSF DA SC67 SC67 PAG 0 SIO 7 CPU 6/ 7 LINE 1-25 (64)
COMMAND INPUT ==>>>
PREFIX* DEST=LOCAL OWNER* SORT=JOBNAME/A
NP JOBNAM STRFRM PROCTSTP JOBID OWNER C POS DP REAL PAGING SIO
*MASTER* STC06373 *MASTER* NS FF 1369 0.00 0.00
ALLCASH ALLCASH NS FF 190 0.00 0.00
ANTAR000 ANTAR000 IEFFROC NS FE 1216 0.00 0.00
ANTMAIN ANTMAIN IEFFROC NS FF 4541 0.00 0.00
ASPC ASPC ASPC NS FE 2653 0.00 0.00
ASCH ASCH ASCH NS FE 267 0.00 0.00
BPXK0INT BPXK0INT BPXK0INT LO FF 315 0.00 0.00
CATALOG CATALOG IEFFROC NS FF 1246 0.00 0.00
CICS3PAAY CICS3PAAY CICS32D STC066504 STC NS FE 4330 0.00 0.00
CONSOLE CONSOLE NS FF 597 0.00 0.00
DPRM DPRM IEFFROC STC06363 STC NS FE 512 0.00 0.00
DFNSHSH RMSSC67 DFNSHSH STC11178 STC NS FE 6199 0.00 0.00
DOWNSV DOWNSV DOWNSV NS FF 160 0.00 0.00
FTDOWS1 STEP1 STC06477 STC LO FF 470 0.00 0.00
FTPDOE1 STEP1 STC06475 FTPDOE LO FF 469 0.00 0.00
GSD GSD NS FF 894 0.00 0.00
IEFSCHAS IEFSCHAS NS FF 25 0.00 0.00
IMWBRSUF IMWBRSUF WBRSSV STC15245 WBRSSV IN FE 15T 0.00 0.00
```

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Issuing MVS and JES commands

Display Filter View Print Options Help

```
SDSF PRIMARY OPTION MENU PARM INVALID
COMMAND INPUT ==>>> /SET PROG
SCROLL ==>>> PAGE
```

System Command Extension

Type or complete typing a system command, then press Enter.

====> SET PROG

====>

Place the cursor on a command and press Enter to retrieve it. More: *

LO
SR
MA
JC => D I
SE => CANCEL U-ORSI
RE => SET PROG
EN
PS
->
->
->
->
->

F1=Help F2=Split F3=Cancel F4=FullScr F7=Backward
F8=Forward F9=Swap F11=ClearList F12=Cancel

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SDSF: Input queue panel

Display Filter View Print Options Help

```
SDSF INPUT QUEUE DISPLAY ALL CLASSES LINE 1-7 (7)
COMMAND INPUT ==>>>
PREFIX* DEST=LOCAL OWNER* SYSNAME*
NP JOBNAM JobID Owner Pcty C Pos PrtDest Rnt Node Snt
BARTR10B J0806472 BARTR1 10 A LOCAL 1
BARTR10B J0806479 BARTR1 10 A LOCAL 1
BARTR10B J0806561 BARTR1 10 A LOCAL 1
BARTR10B J0806568 BARTR1 10 A LOCAL 1
BARTR10B J0806588 BARTR1 10 A LOCAL 1
BARTR10B J0806588 BARTR1 10 A LOCAL 1
BARTTEP1 J0809130 BART 10 A LOCAL 1 SC6
```

F1-HELP F2-SPLIT F3-END F4-RETURN F5-IFIND F6-BOOK
F7-UP F8-DOWN F9-SWAP F10-LEFT F11-RIGHT F12-RETRIEVE

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SDSF: Output queue panel

Display Filter View Print Options Help

```
SDSF OUTPUT ALL CLASSES ALL FORMS LINES 304,174
COMMAND INPUT ==>>>
PREFIX* DEST=(ALL) OWNER* SYSNAME*
NP JOBNAM JobID Owner Pcty C Forms Dest Tot-Rec
RMF STC16499 STC 144 A STD LOCAL 145
JONESB J0817936 JONES 144 A STD LOCAL 34
JONESB J0817937 JONES 144 A STD LOCAL 145
RMF STC17997 STC 144 A STD LOCAL 1
RMF STC18579 STC 144 A STD LOCAL 1
RMF STC13665 STC 144 A STD LOCAL 24
LUTZ TSU20905 LUTZ 144 A STD LOCAL 24
LUTZ TSU20206 LUTZ 144 A STD LOCAL 24
LUTZ TSU20555 LUTZ 144 A STD LOCAL 24
ARSD1X J0820692 IMSRES1 144 A STD LOCAL 29
ARSD1X J0820693 IMSRES1 144 A STD LOCAL 29
LDAPK1 STC19880 LDAPK1 144 A STD LOCAL 54
RMF STC19444 STC 144 A STD LOCAL 19
HSH STC21908 STC 144 A STD LOCAL 18
HSH STC21908 STC 144 A STD LOCAL 19
HSH STC21908 STC 144 A STD LOCAL 2
HSH STC21908 STC 144 A STD LOCAL 2
HSH STC21908 STC 144 A STD LOCAL 375
HSH J0822149 VBUDI 144 A STD LOCAL 101
HSH J0822151 VBUDI 144 A STD LOCAL 101
```

F1-HELP F2-SPLIT F3-END F4-RETURN F5-IFIND F6-BOOK
F7-UP F8-DOWN F9-SWAP F10-LEFT F11-RIGHT F12-RETRIEVE

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SDSF: Held output queue panel

Display Filter View Print Options Help

```
SDSF HELD OUTPUT DISPLAY ALL CLASSES LINES 194
COMMAND INPUT ==>>>
PREFIX* DEST=(ALL) OWNER* SYSNAME*
NP JOBNAM JobID Owner Pcty C D01sp Best Tot-Rec Int-
MIR10M2 J0826044 MIR10M 144 I HOLD LOCAL 44
MIR10M2 J0826059 MIR10M 144 I HOLD LOCAL 30
MIR10M3 J0826070 MIR10M 144 I HOLD LOCAL 30
MIR10M4 J0826071 MIR10M 144 I HOLD LOCAL 30
MIR10M5 J0826072 MIR10M 144 I HOLD LOCAL 30
MIR10M6 J0826073 MIR10M 144 I HOLD LOCAL 30
```

F1-HELP F2-SPLIT F3-END F4-RETURN F5-IFIND F6-BOOK
F7-UP F8-DOWN F9-SWAP F10-LEFT F11-RIGHT F12-RETRIEVE

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SDSF: Status panel

Display Filter View Print Options Help

```
SDSF STATUS DISPLAY ALL CLASSES LINE 1-24 (281)
COMMAND INPUT ==>>>
PREFIX* DEST=(ALL) OWNER* SYSNAME*
NP JOBNAM JobID Owner Pcty Queue C Pos SATT ASUS Status
BARTR10B J0806472 BARTR1 10 EXECUTION A HOLD
BARTR10B J0806479 BARTR1 10 EXECUTION A HOLD
BARTR10B J0806561 BARTR1 10 EXECUTION A HOLD
BARTR10B J0806565 BARTR1 10 EXECUTION A HOLD
BARTR10B J0806568 BARTR1 10 EXECUTION A HOLD
BARTR10B J0806588 BARTR1 10 EXECUTION A HOLD
BARTTEP1 J0809130 BART 10 EXECUTION A SC63 HOLD
IMSS1D3 TSU26092 IMSS1D3 15 EXECUTION A SC64 SC64
MRT1 TSU26034 MRT1 15 EXECUTION A SC64 SC64
MIR10M TSU26043 MIR10M 15 EXECUTION A SC63 SC63
MIR10M TSU26059 MIR10M 15 EXECUTION A SC63 SC63
BARTR4 TSU26051 BARTR4 15 EXECUTION A SC63 SC63
RAV1 TSU26052 RAV1 15 EXECUTION A SC63 SC63
BARTR2 TSU26060 BARTR2 15 EXECUTION A SC63 SC63
VBUDI1 TSU26062 VBUDI1 15 EXECUTION A SC64 SC64
SYSLOG STC24863 *MASTER* 15 EXECUTION A SC63 SC63
RACF STC24871 RACF 15 EXECUTION A SC63 SC63
SYSLOG STC24931 *MASTER* 15 EXECUTION A SC64 SC64
RACF STC24941 RACF 15 EXECUTION A SC64 SC64
OPTSD STC24857 STC 15 EXECUTION A SC63 SC63
QMS STC24858 STC 15 EXECUTION A SC63 SC63
RMF STC24855 STC 15 EXECUTION A SC63 SC63
SDSF STC24862 STC 15 EXECUTION A SC63 SC63 ARNELEM
ASCHINT STC24867 STC 15 EXECUTION A SC63 SC63
```

F1-HELP F2-SPLIT F3-END F4-RETURN F5-IFIND F6-BOOK
F7-UP F8-DOWN F9-SWAP F10-LEFT F11-RIGHT F12-RETRIEVE

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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:
 - IEBCGENER Copies a sequential data set
 - IEBCOPY Copies a partitioned data set
 - IDCAMS 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.