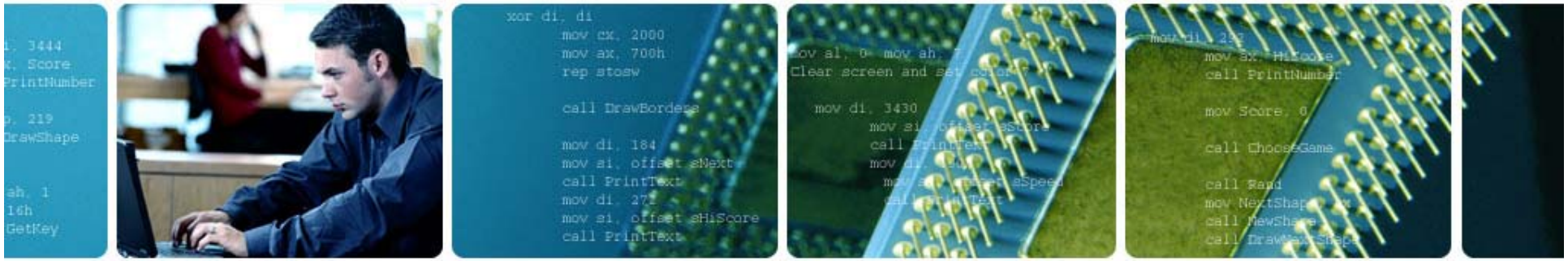
IBM

Introduction to the new mainframe

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



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**

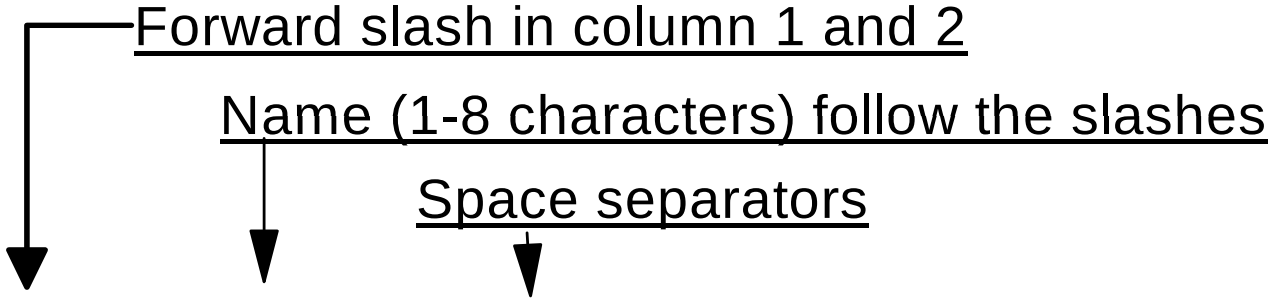
Basic JCL coding syntax

JCL must be uppercase

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
```

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

```
EDIT       MIRIAM.PRIVATE.JCLLIB(JOB1) - 01.05            Columns 00001 00072
Command ===> _                                             Scroll ===> HALF
****** ***************************** Top of Data ********************************
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,
000008 //           DISP=(NEW,CATLG,DELETE),UNIT=SYSDA,
000009 //           SPACE=(CYL,(10,10,45)),LRECL=80,BLKSIZE=3120
****** **************************** Bottom of Data ******************************
```

JCL: EXEC statement

- EXEC statement
  - Region size

```
EDIT       MIRIAM.PRIVATE.JCLLIB(JOB1) - 01.05            Columns 00001 00072
Command ===> _                                             Scroll ===> HALF
****** ***************************** Top of Data ********************************
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,
000008 //           DISP=(NEW,CATLG,DELETE),UNIT=SYSDA,
000009 //           SPACE=(CYL,(10,10,45)),LRECL=80,BLKSIZE=3120
****** **************************** Bottom of Data ******************************
```

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 ===> HALF
****** ***************************** Top of Data ********************************
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,
000008 //           DISP=(NEW,CATLG,DELETE),UNIT=SYSDA,
000009 //           SPACE=(CYL,(10,10,45)),LRECL=80,BLKSIZE=3120
****** **************************** Bottom of Data ******************************
```

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
```

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)
```

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=IBMUSER.AREA.CODES
//MYSORT.SORTOUT DD DSN=IBMUSER.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)
```

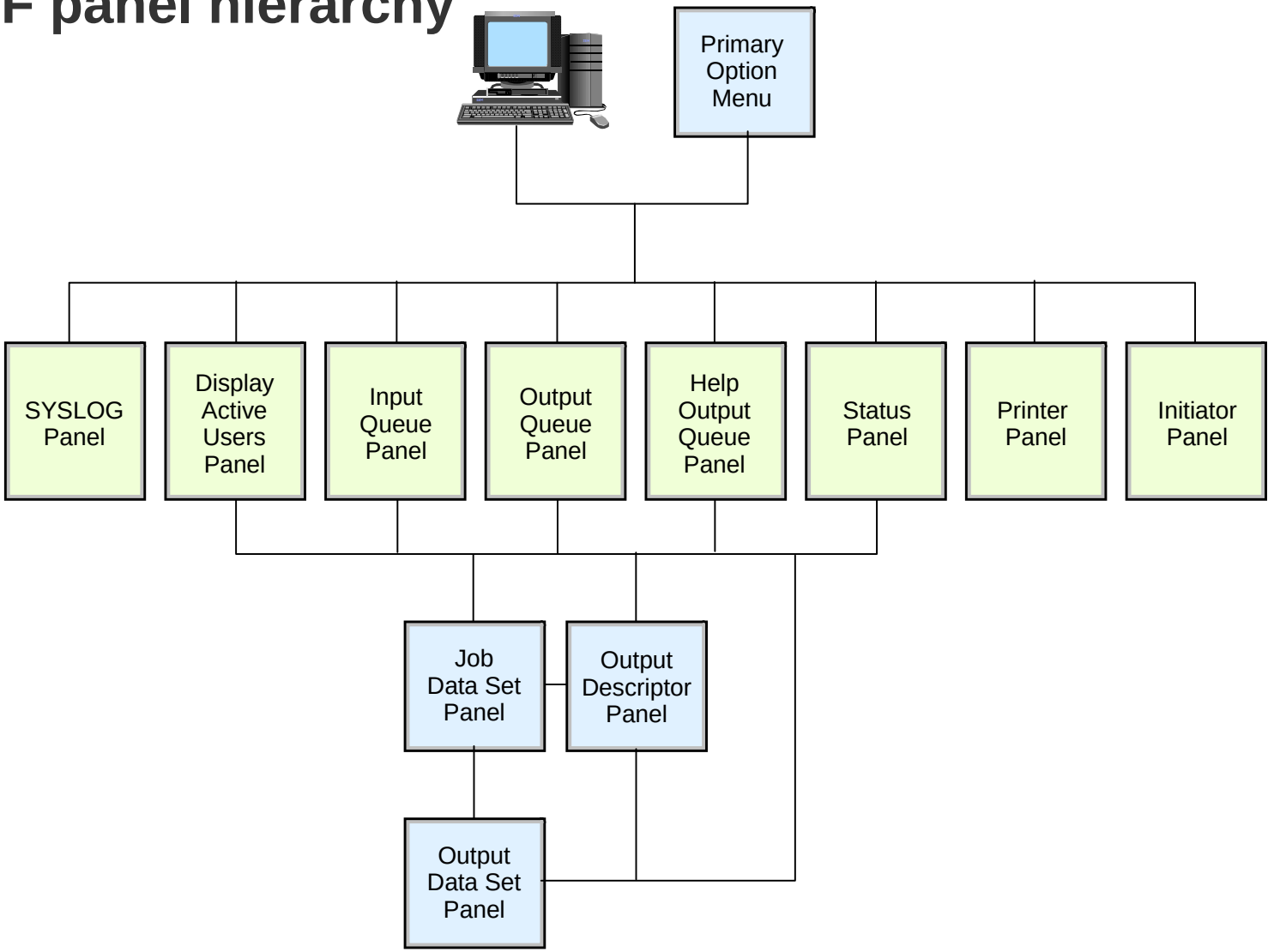
Using SDSF

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.

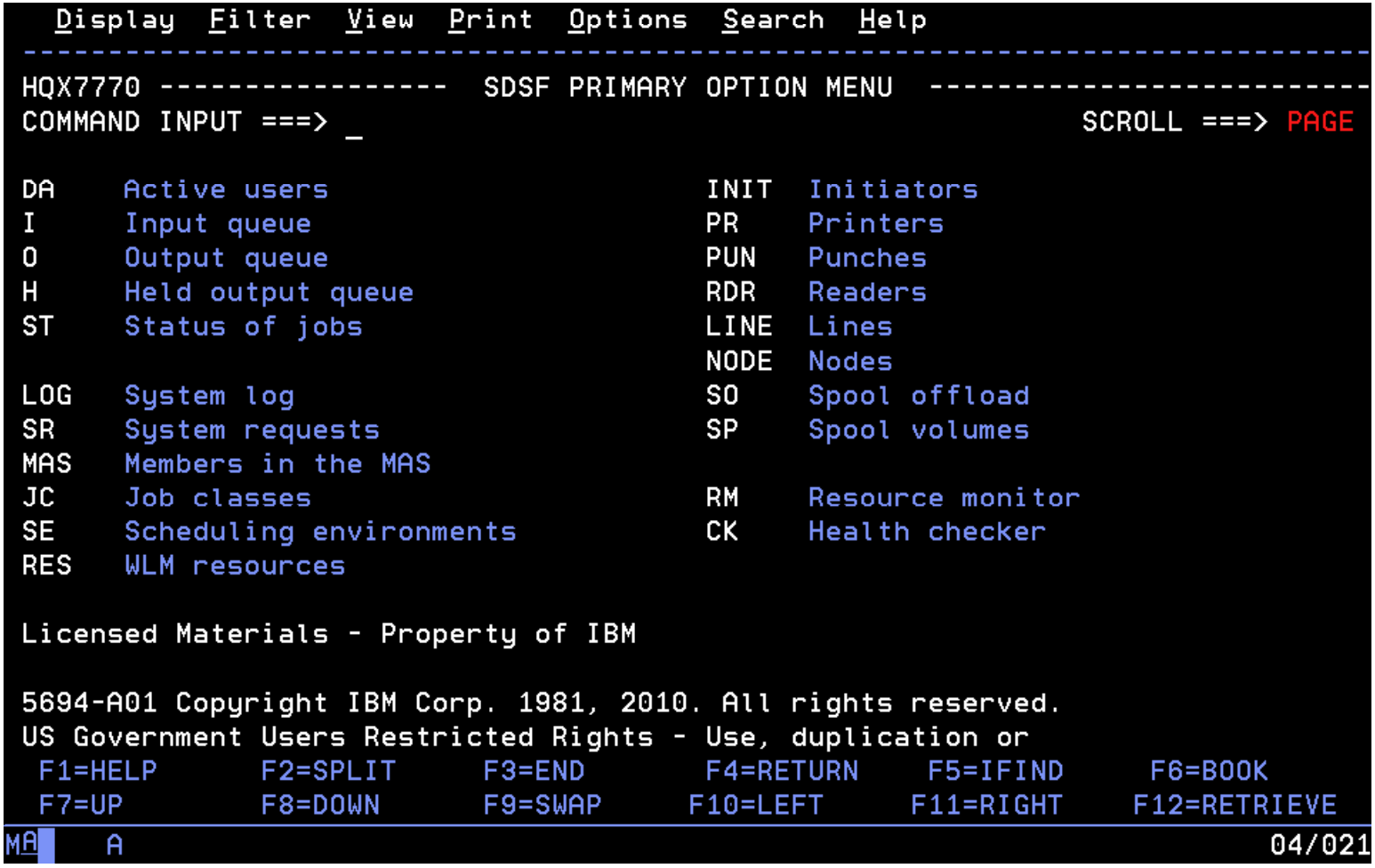
SDSF allows users to:

- 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

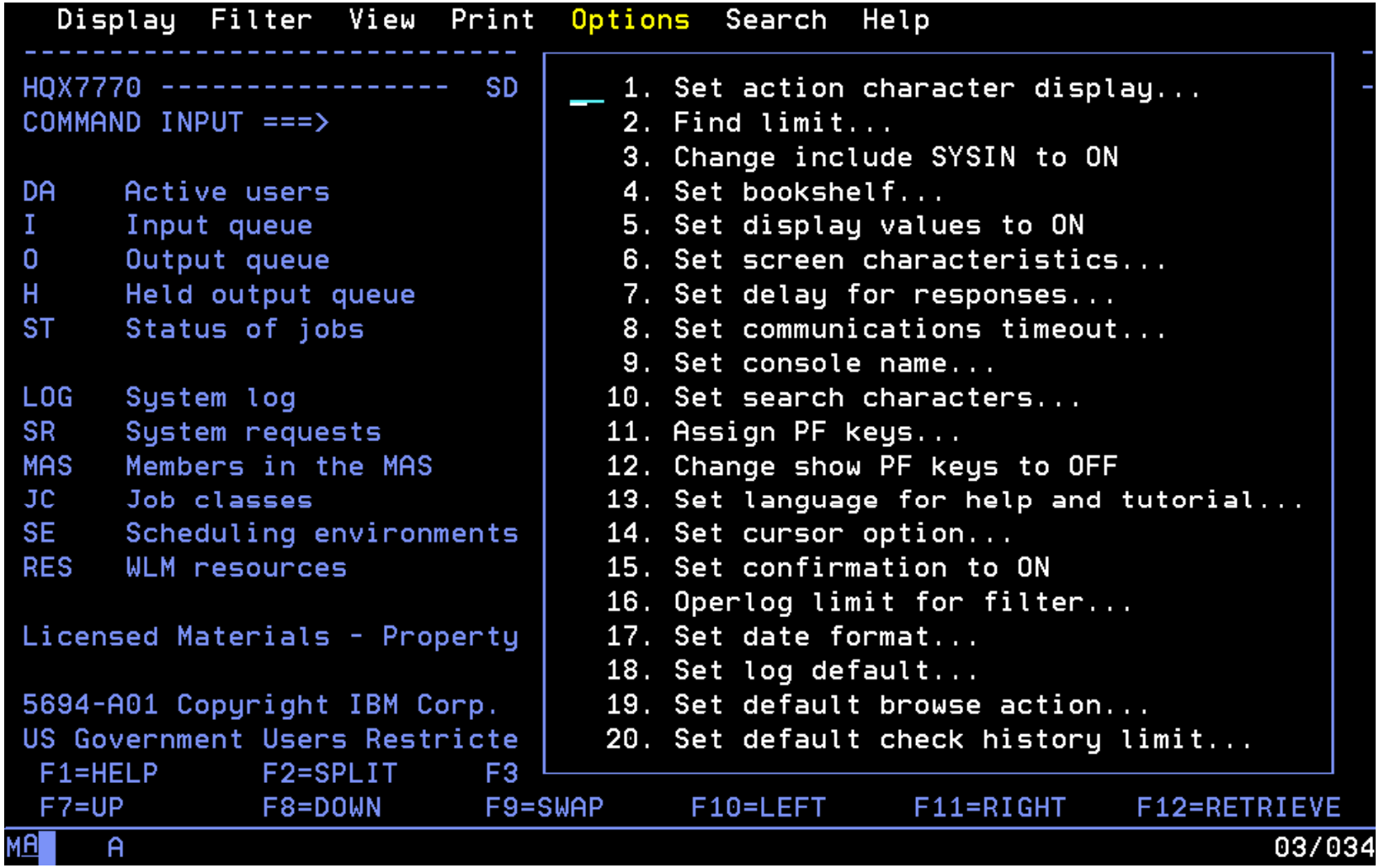
SDSF panel hierarchy



SDSF: Primary option menu



SDSF: Options menu



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=*  DEST=(ALL)  OWNER=*  SYSNAME=
NP    JOBNAME  JobID    Owner    Prty C ODisp Dest                 Tot-Rec  Tot-
?_    MIRIAM2  JOB26044 MIRIAM    144 T HOLD  LOCAL                     44
```

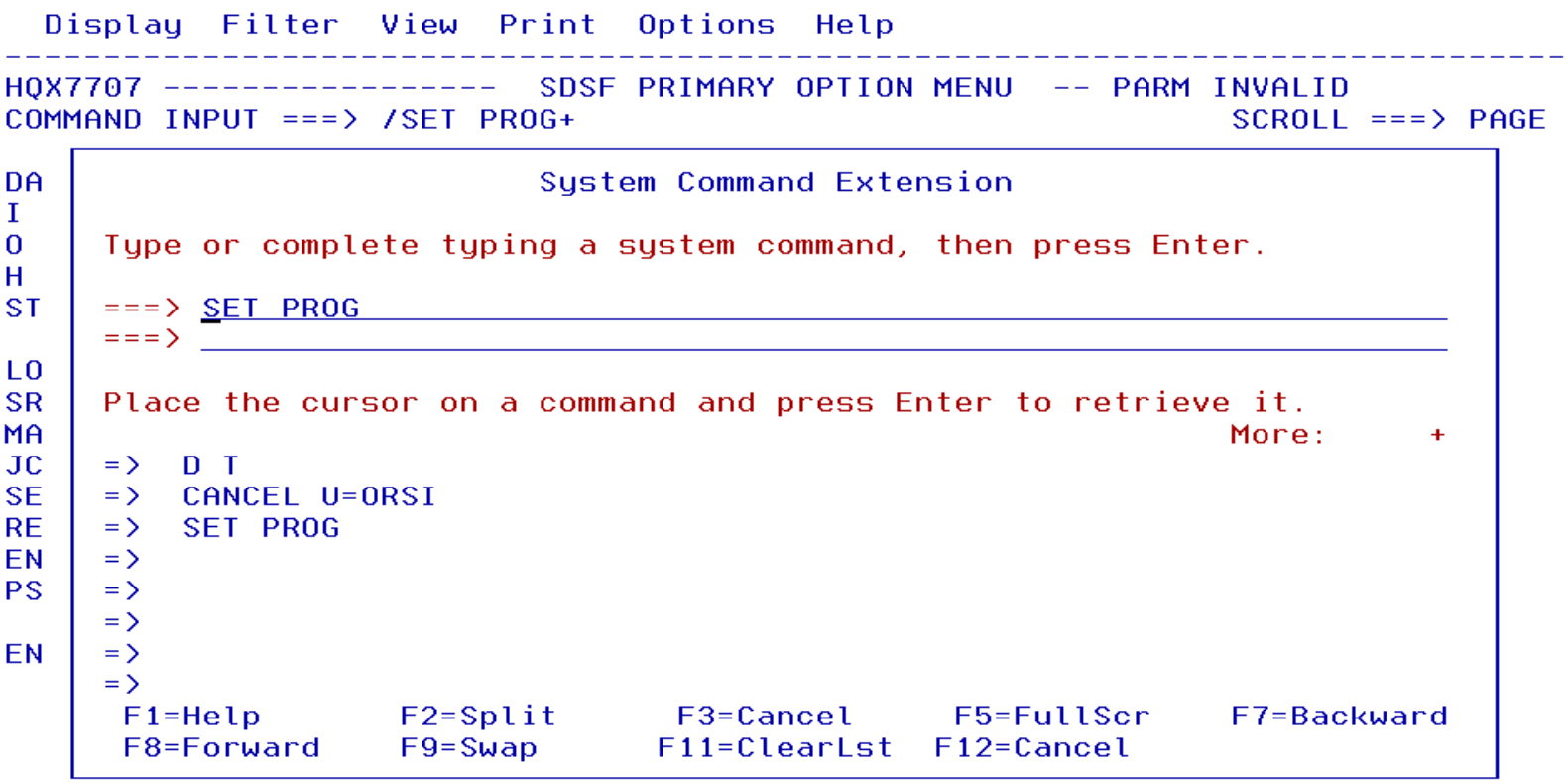
Screen 2

```
  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=
NP    DDNAME   StepName ProcStep DSID Owner    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)

```
  Display  Filter  View  Print  Options  Search  Help
-------------------------------------------------------------------------------
SDSF DA SC80     SC80     PAG  0  CPU/L/Z   3/  3/  0  LINE 35-51 (76)
COMMAND INPUT ===> _                                        SCROLL ===> PAGE
NP   JOBNAME  StepName ProcStep JobID    Owner    C 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     IN  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 IBMUSER  LO  FF  421   0.00   0.00
     PCAUTH   PCAUTH                             NS  FF  210   0.00   0.00
     PFA      PFA      PFA      STC00242 PFA      IN  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=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP     F10=LEFT     F11=RIGHT    F12=RETRIEVE
MA    A                                                              04/021
```

Issuing MVS and JES commands



SDSF: Input queue panel

```
  Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF INPUT QUEUE DISPLAY ALL CLASSES                    LINE 1-7 (7)
COMMAND INPUT ===>                                        SCROLL ===> PAGE
PREFIX=*  DEST=(ALL)  OWNER=*  SYSNAME=
NP    JOBNAME  JobID    Owner    Prty C   Pos PrtDest              Rmt  Node SAf
      BARTR1DB JOB06472 BARTR1     10 A       LOCAL                      1
      BARTR1DB JOB06479 BARTR1     10 A       LOCAL                      1
      BARTR1DB JOB06561 BARTR1     10 A       LOCAL                      1
      BARTR1DB JOB06565 BARTR1     10 A       LOCAL                      1
      BARTR1DB JOB06568 BARTR1     10 A       LOCAL                      1
      BARTR1DB JOB06588 BARTR1     10 A       LOCAL                      1
      BARTTEP1 JOB09138 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
```

SDSF: Output queue panel

```
  Display  Filter  View  Print  Options  Help
------------------------------------------------------------------------------
SDSF OUTPUT ALL CLASSES ALL FORMS     LINES 304,174    LINE 1-24 (266)
COMMAND INPUT ===>                                     SCROLL ===> PAGE
PREFIX=*  DEST=(ALL)  OWNER=*  SYSNAME=
NP    JOBNAME  JobID    Owner    Prty C Forms    Dest                 Tot-Rec
      RMF      STC16499 STC        144 A STD      LOCAL
      JJONESDB JOB17936 JJONES     144 A STD      LOCAL                    34
      JJONESDB JOB17937 JJONES     144 A STD      LOCAL                   145
      RMF      STC17097 STC        144 A STD      LOCAL
      RMF      STC18679 STC        144 A STD      LOCAL
      RMF      STC13665 STC        144 A STD      LOCAL
      LUTZ     TSU20005 LUTZ       144 A STD      LOCAL                    24
      LUTZ     TSU20206 LUTZ       144 A STD      LOCAL                    24
      LUTZ     TSU20555 LUTZ       144 A STD      LOCAL                    24
      ARS01X   JOB20692 TWSRES1    144 A STD      LOCAL                    29
      ARS01X   JOB20693 TWSRES1    144 A STD      LOCAL                    29
      ARS01X   JOB20717 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 A STD      LOCAL                    19
      HSM      STC21908 STC        144 A STD      LOCAL                     2
      HSM      STC21908 STC        144 A STD      LOCAL                     2
      HSM      STC21908 STC        144 A STD      LOCAL                     2
      TWS      JOB22149 VBUDI      144 A STD      LOCAL                   354
      TWS      JOB22151 VBUDI      144 A STD      LOCAL                   375
      TWS      JOB22153 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
```

SDSF: Held output queue panel

```
  Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF HELD OUTPUT DISPLAY ALL CLASSES  LINES 194        LINE 1-6 (6)
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
      MIRIAM2  JOB26069 MIRIAM    144 T HOLD  LOCAL                    30
      MIRIAM3  JOB26070 MIRIAM    144 T HOLD  LOCAL                    30
      MIRIAM4  JOB26071 MIRIAM    144 T HOLD  LOCAL                    30
      MIRIAM5  JOB26072 MIRIAM    144 T HOLD  LOCAL                    30
      MIRIAM6  JOB26073 MIRIAM    144 T 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
```

SDSF: Status panel

```
 Display  Filter  View  Print  Options  Help
-------------------------------------------------------------------------------
SDSF STATUS DISPLAY ALL CLASSES                          LINE 1-24 (3281)
COMMAND INPUT ===> _                                     SCROLL ===> PAGE
PREFIX=*  DEST=(ALL)  OWNER=*  SYSNAME=
NP    JOBNAME  JobID    Owner    Prty Queue      C  Pos  SAff  ASys Status
      BARTR1DB JOB06472 BARTR1    10 EXECUTION  A                  HOLD
      BARTR1DB JOB06479 BARTR1    10 EXECUTION  A                  HOLD
      BARTR1DB JOB06561 BARTR1    10 EXECUTION  A                  HOLD
      BARTR1DB JOB06565 BARTR1    10 EXECUTION  A                  HOLD
      BARTR1DB JOB06568 BARTR1    10 EXECUTION  A                  HOLD
      BARTR1DB JOB06588 BARTR1    10 EXECUTION  A                  HOLD
      BARTTEP1 JOB09138 BART      10 EXECUTION  A       SC63       HOLD
      TWSSTD3  TSU26002 TWSSTD3   15 EXECUTION        SC64  SC64
      KMT1     TSU26024 KMT1      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=END       F4=RETURN    F5=IFIND     F6=BOOK
 F7=UP        F8=DOWN      F9=SWAP     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 — 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.