JCL and Programming On the MVS Turnkey System

This assumes you’ve already set up, run, connected to, and logged in to an MVS Turnkey system. If not, you can find instructions here.

About

A job to be run consists of two parts:

1. JCL to tell the mainframe how to run the program, and
2. The actual program, written in a language with a supporting compiler on the mainframe.

```
// JCL comes first, and is prefixed by two slashes
The program source follows.
```

⚠ The JCL message class must be set to ‘H’, or you won’t be able to see the output from your jobs.

The ‘H’ indicates to the system that the output should be ‘Held’, making it available for viewing in the OUTLIST utility, in Data Set Utilities.

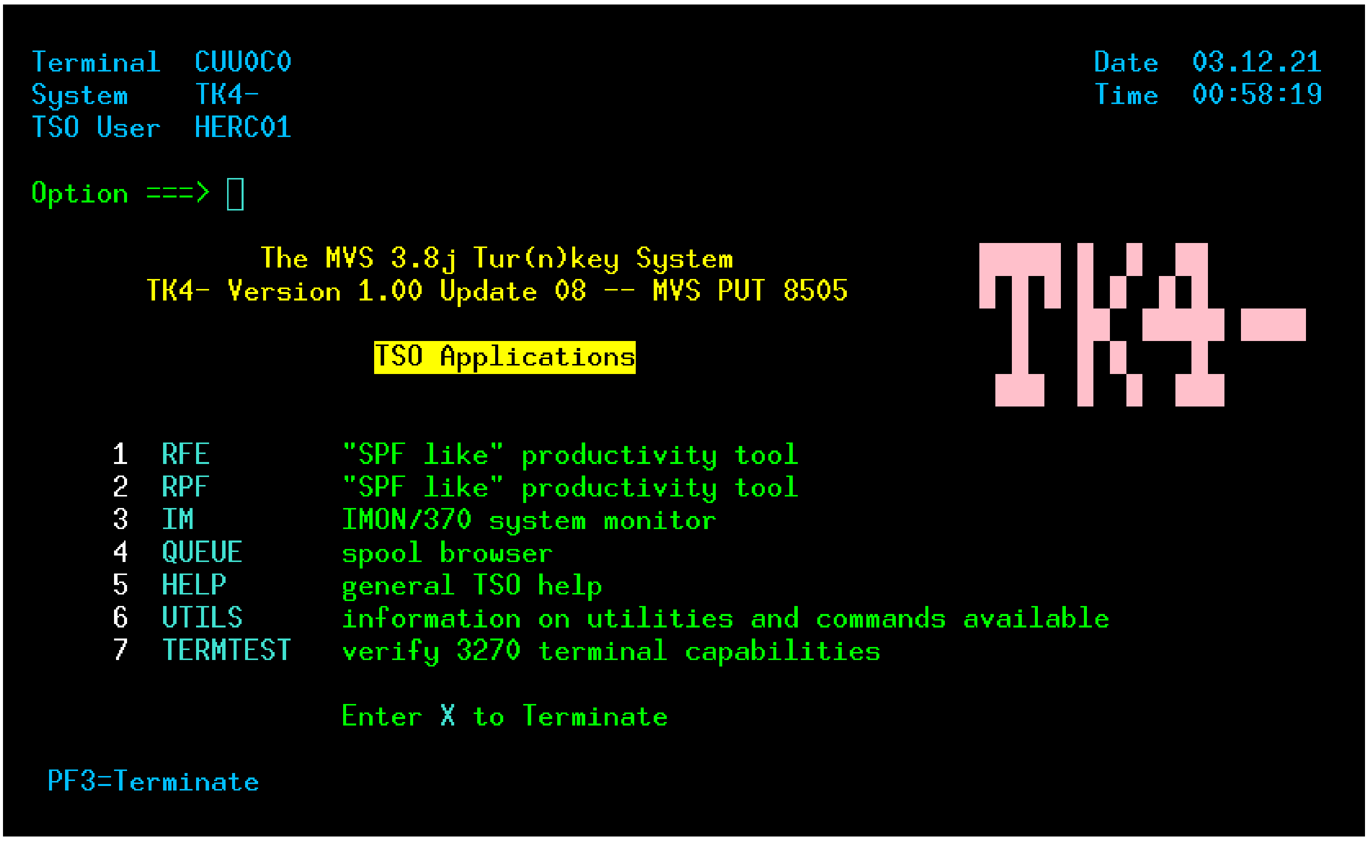
COBOL

COBOL first appeared in 1959. The latest stable release was in 2014. It’s meant to be “English-like” in syntax.

COBOL is still widely deployed. For example, as of 2017, about 95 percent of ATM swipes use COBOL code, and it powers 80 percent of in-person transactions.

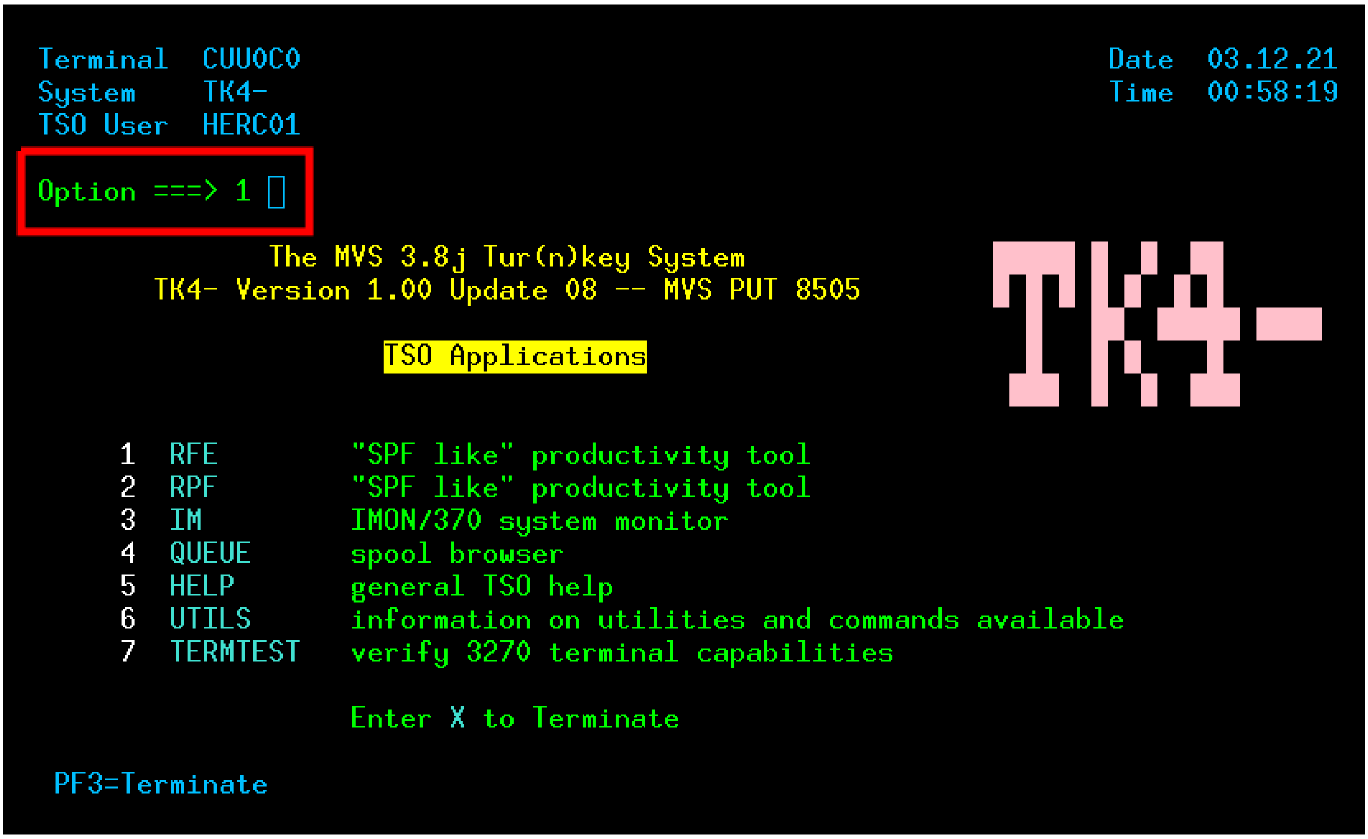
Create and Submit the Job

Your starting point should be the main screen:



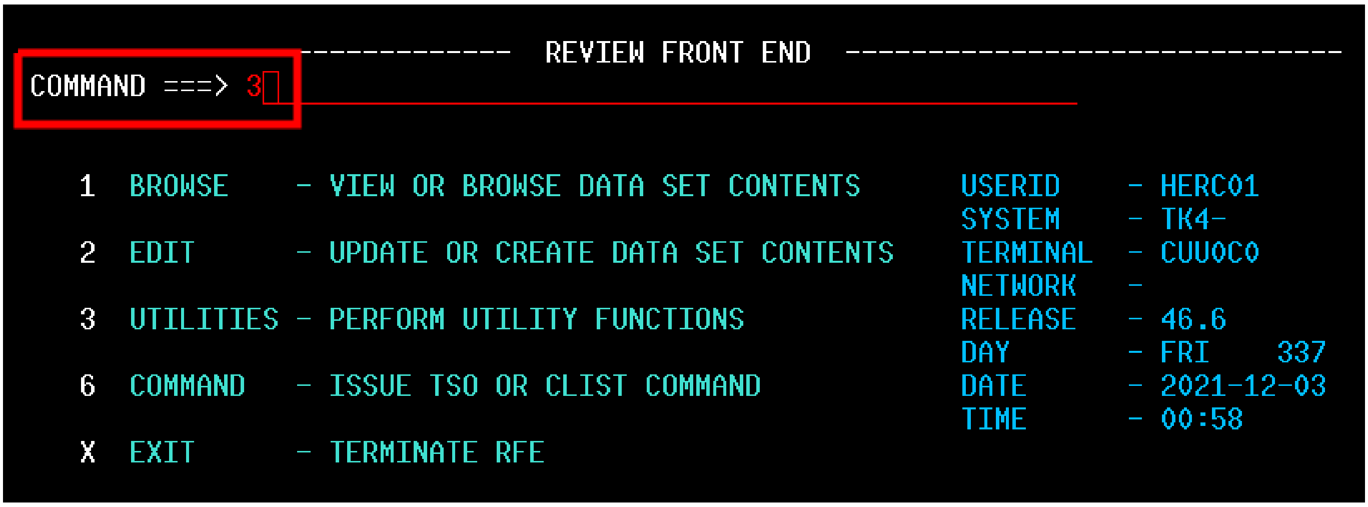
```
Terminal  CUU0C0                                                      Date  03.12.21
System    TK4-                                                        Time  00:58:19
TSO User  HERC01

Option ===> 

                The MVS 3.8j Tur(n)key System
         TK4- Version 1.00 Update 08 -- MVS PUT 8505

                         TSO Applications


      1  RFE         "SPF like" productivity tool
      2  RPF         "SPF like" productivity tool
      3  IM          IMON/370 system monitor
      4  QUEUE       spool browser
      5  HELP        general TSO help
      6  UTILS       information on utilities and commands available
      7  TERMTEST    verify 3270 terminal capabilities

                     Enter X to Terminate

 PF3=Terminate
```

Enter '1' to access the RFE tool:



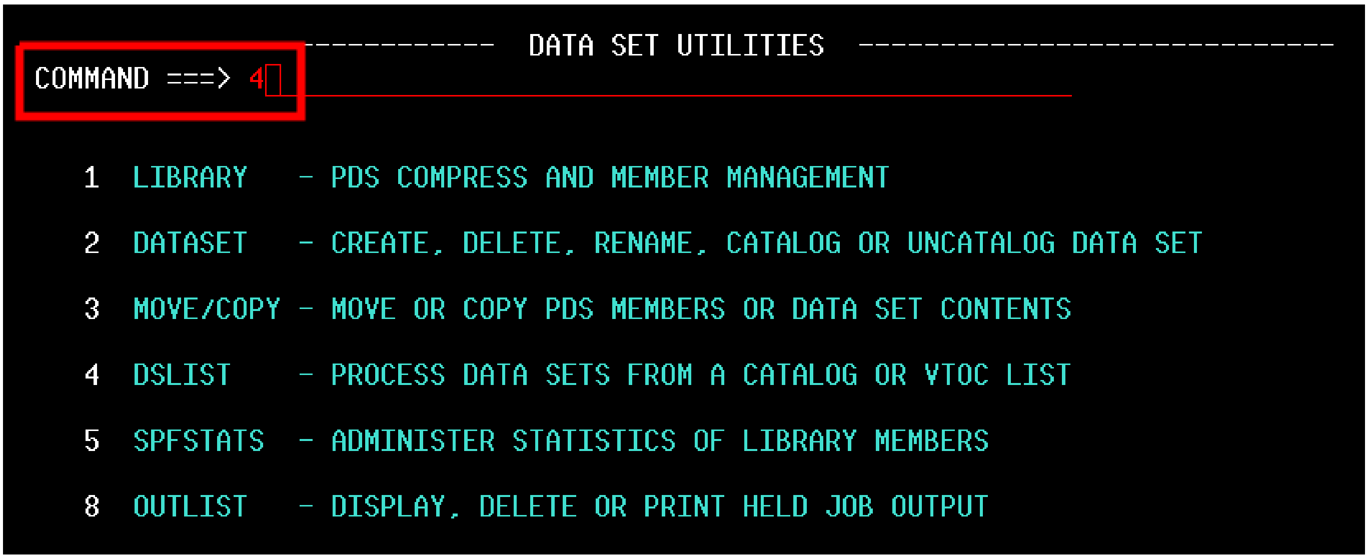
```
Terminal  CUU0C0                                                      Date  03.12.21
System    TK4-                                                        Time  00:58:19
TSO User  HERC01

Option ===> 1 

                The MVS 3.8j Tur(n)key System
         TK4- Version 1.00 Update 08 -- MVS PUT 8505

                         TSO Applications


      1  RFE         "SPF like" productivity tool
      2  RPF         "SPF like" productivity tool
      3  IM          IMON/370 system monitor
      4  QUEUE       spool browser
      5  HELP        general TSO help
      6  UTILS       information on utilities and commands available
      7  TERMTEST    verify 3270 terminal capabilities

                     Enter X to Terminate

 PF3=Terminate
```

Enter '3' to access utility functions:



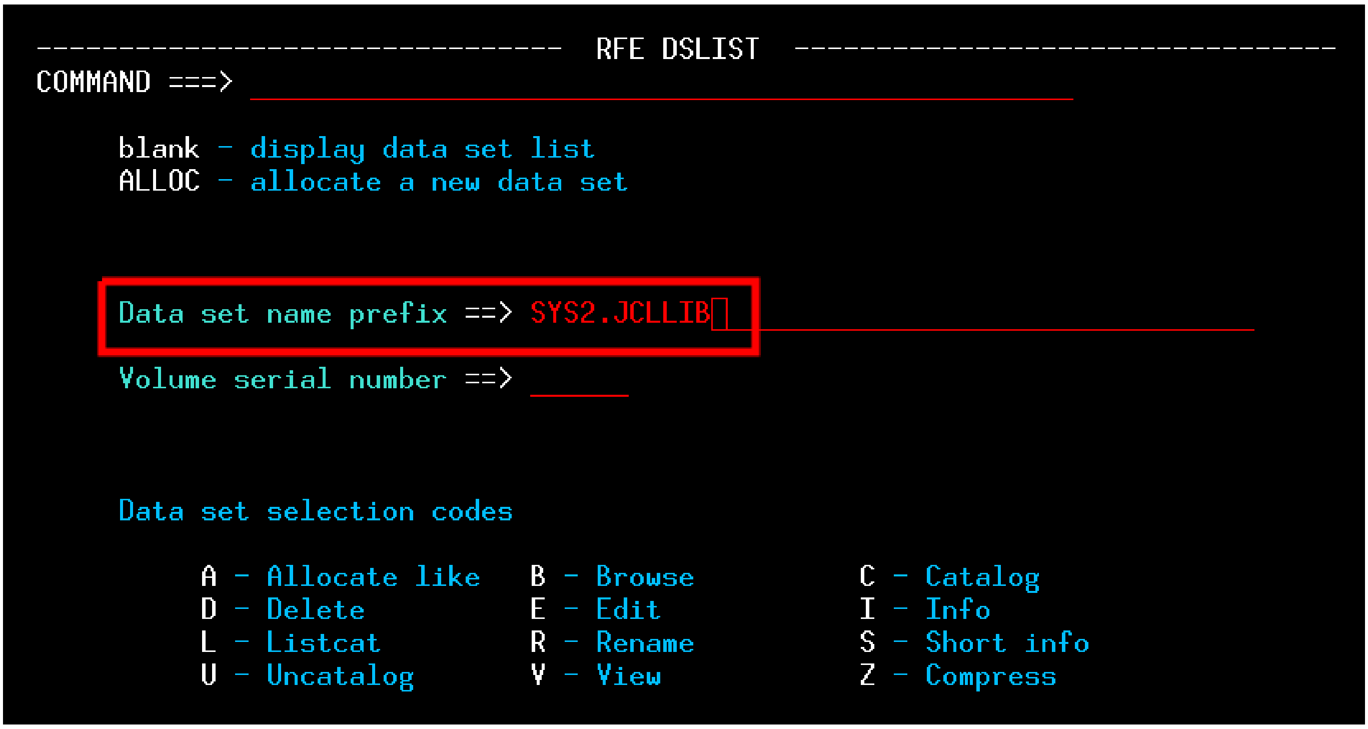
```
 ------------------------------ REVIEW FRONT END ------------------------------
 COMMAND ===> 3

   1  BROWSE    - VIEW OR BROWSE DATA SET CONTENTS      USERID    - HERC01
                                                        SYSTEM    - TK4-
   2  EDIT      - UPDATE OR CREATE DATA SET CONTENTS    TERMINAL  - CUU0C0
                                                        NETWORK   -
   3  UTILITIES - PERFORM UTILITY FUNCTIONS             RELEASE   - 46.6
                                                        DAY       - FRI    337
   6  COMMAND   - ISSUE TSO OR CLIST COMMAND            DATE      - 2021-12-03
                                                        TIME      - 00:58
   X  EXIT      - TERMINATE RFE
```

Enter '4' to access the Data Set list:



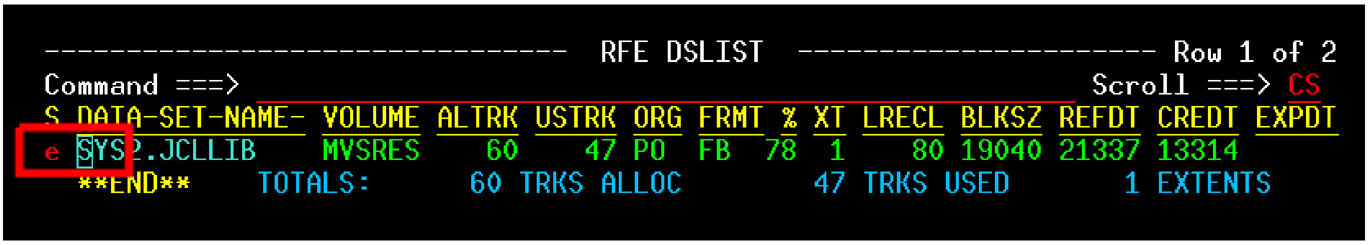
```
 ------------------------------ DATA SET UTILITIES ------------------------------
 COMMAND ===> 4

   1  LIBRARY   - PDS COMPRESS AND MEMBER MANAGEMENT

   2  DATASET   - CREATE, DELETE, RENAME, CATALOG OR UNCATALOG DATA SET

   3  MOVE/COPY - MOVE OR COPY PDS MEMBERS OR DATA SET CONTENTS

   4  DSLIST    - PROCESS DATA SETS FROM A CATALOG OR VTOC LIST

   5  SPFSTATS  - ADMINISTER STATISTICS OF LIBRARY MEMBERS

   8  OUTLIST   - DISPLAY, DELETE OR PRINT HELD JOB OUTPUT
```

Enter 'SYS2.JCLLIB' to filter the Data Set list:



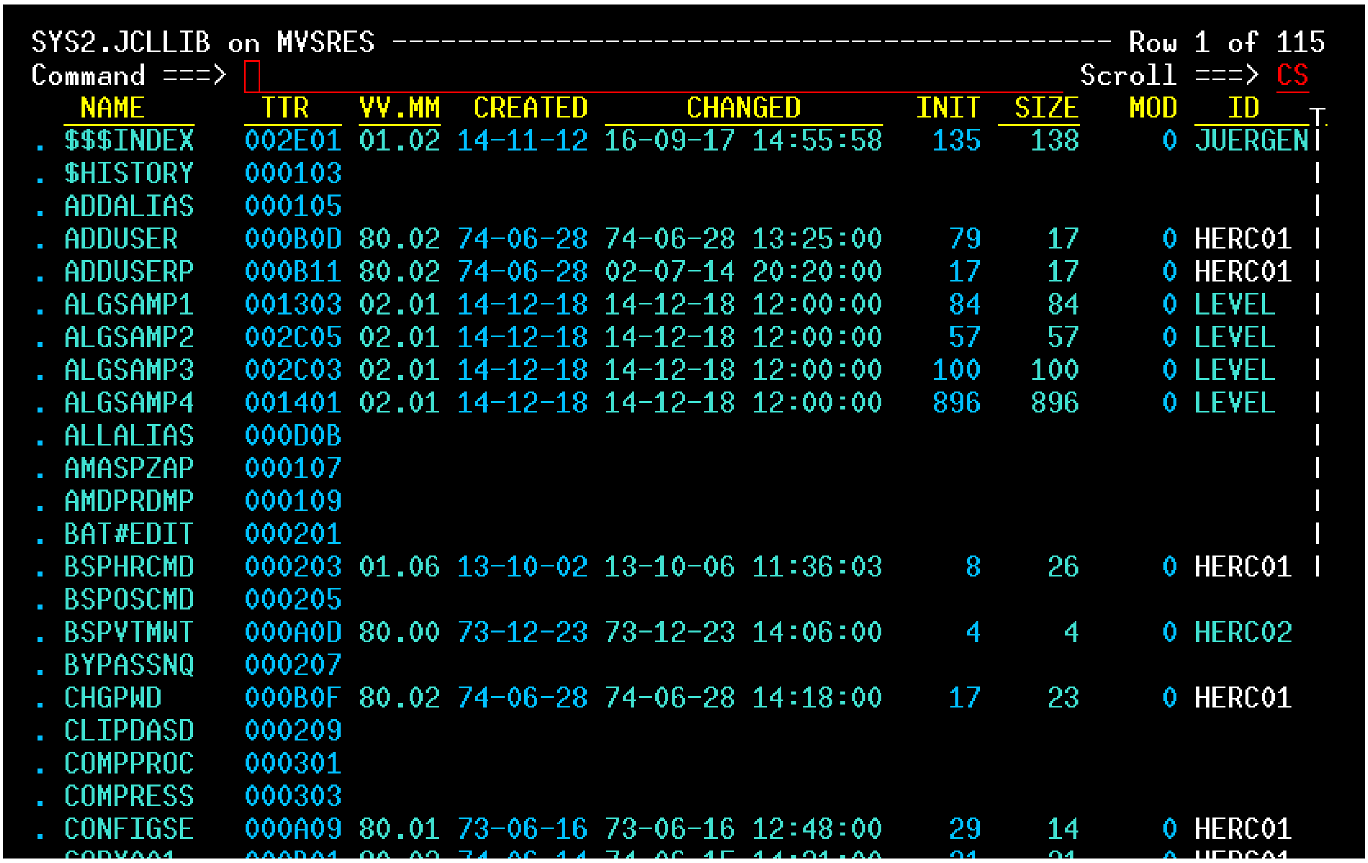
```
 --------------------------------  RFE DSLIST  ---------------------------------
 COMMAND ===>

      blank - display data set list
      ALLOC - allocate a new data set


      Data set name prefix ==> SYS2.JCLLIB

      Volume serial number ==>



      Data set selection codes

           A - Allocate like     B - Browse            C - Catalog
           D - Delete            E - Edit              I - Info
           L - Listcat           R - Rename            S - Short info
           U - Uncatalog         V - View              Z - Compress
```

Tab to the detail line for SYS2.JCLLIB, then enter 'e' in the S column, for Edit:



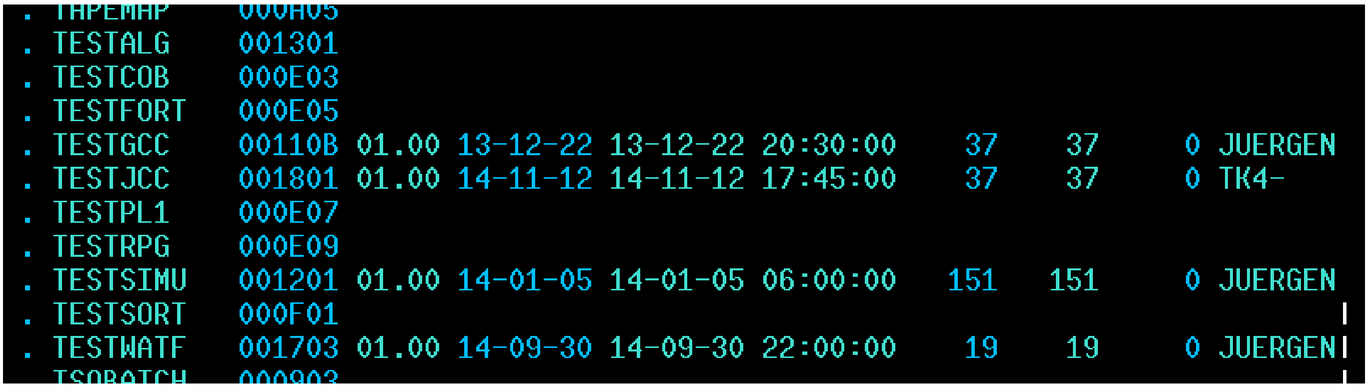
```
 --------------------------------  RFE DSLIST  ---------------------- Row 1 of 2
 Command ===>                                                     Scroll ===> CS
 S DATA-SET-NAME- VOLUME ALTRK USTRK ORG FRMT % XT LRECL BLKSZ REFDT CREDT EXPDT
 e SYS2.JCLLIB    MVSRES    60    47 PO  FB   78  1    80 19040 21337 13314
   **END**     TOTALS:      60 TRKS ALLOC        47 TRKS USED       1 EXTENTS
```

The Data Set list will display:



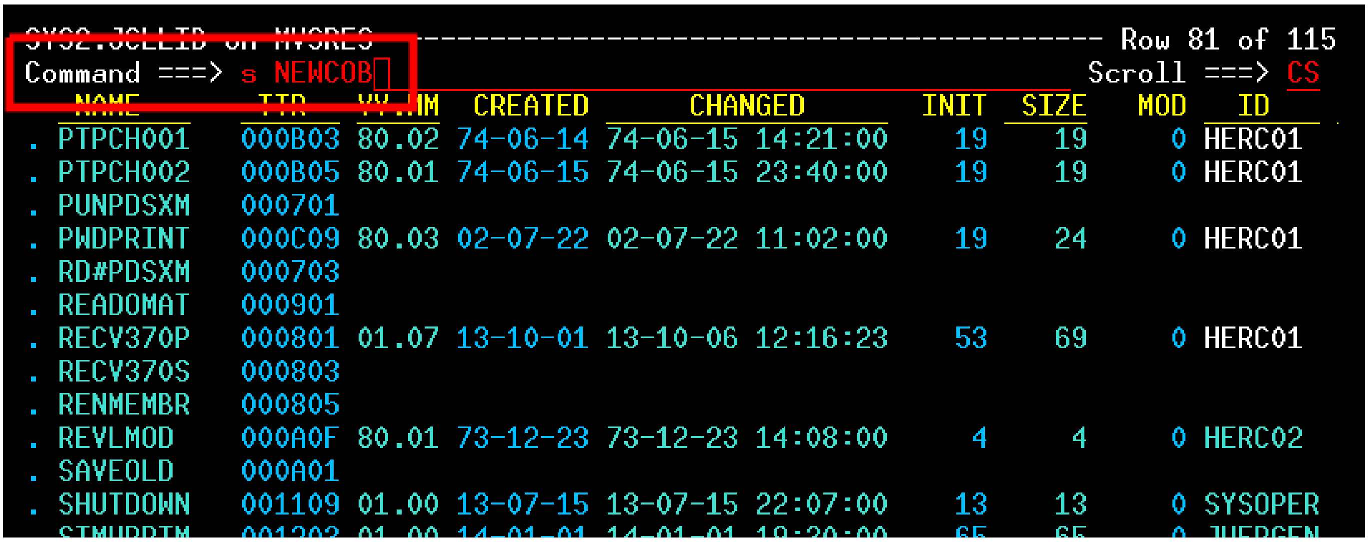
```
 SYS2.JCLLIB on MVSRES ------------------------------------------ Row 1 of 115
 Command ===>                                                    Scroll ===> CS
     NAME      TTR    VV.MM  CREATED       CHANGED       INIT  SIZE   MOD   ID
   . $$$INDEX  002E01 01.02 14-11-12 16-09-17 14:55:58   135   138     0 JUERGEN
   . $HISTORY  000103
   . ADDALIAS  000105
   . ADDUSER   000B0D 80.02 74-06-28 74-06-28 13:25:00    79    17     0 HERC01
   . ADDUSERP  000B11 80.02 74-06-28 02-07-14 20:20:00    17    17     0 HERC01
   . ALGSAMP1  001303 02.01 14-12-18 14-12-18 12:00:00    84    84     0 LEVEL
   . ALGSAMP2  002C05 02.01 14-12-18 14-12-18 12:00:00    57    57     0 LEVEL
   . ALGSAMP3  002C03 02.01 14-12-18 14-12-18 12:00:00   100   100     0 LEVEL
   . ALGSAMP4  001401 02.01 14-12-18 14-12-18 12:00:00   896   896     0 LEVEL
   . ALLALIAS  000D0B
   . AMASPZAP  000107
   . AMDPRDMP  000109
   . BAT#EDIT  000201
   . BSPHRCMD  000203 01.06 13-10-02 13-10-06 11:36:03     8    26     0 HERC01
   . BSPOSCMD  000205
   . BSPVTMWT  000A0D 80.00 73-12-23 73-12-23 14:06:00     4     4     0 HERC02
   . BYPASSNQ  000207
   . CHGPWD    000B0F 80.02 74-06-28 74-06-28 14:18:00    17    23     0 HERC01
   . CLIPDASD  000209
   . COMPPROC  000301
   . COMPRESS  000303
   . CONFIGSE  000A09 80.01 73-06-16 73-06-16 12:48:00    29    14     0 HERC01
```

If you press [F8] (*page down*) a few times, you'll see several Data Sets with names that begin with 'TEST'. These are test programs for various languages:



```
 . TAPEMAP   000A05
 . TESTALG   001301
 . TESTCOB   000E03
 . TESTFORT  000E05
 . TESTGCC   00110B 01.00 13-12-22 13-12-22 20:30:00    37    37     0 JUERGEN
 . TESTJCC   001801 01.00 14-11-12 14-11-12 17:45:00    37    37     0 TK4-
 . TESTPL1   000E07
 . TESTRPG   000E09
 . TESTSIMU  001201 01.00 14-01-05 14-01-05 06:00:00   151   151     0 JUERGEN
 . TESTSORT  000F01
 . TESTWATF  001703 01.00 14-09-30 14-09-30 22:00:00    19    19     0 JUERGEN
 . TSOBATCH  000903
```

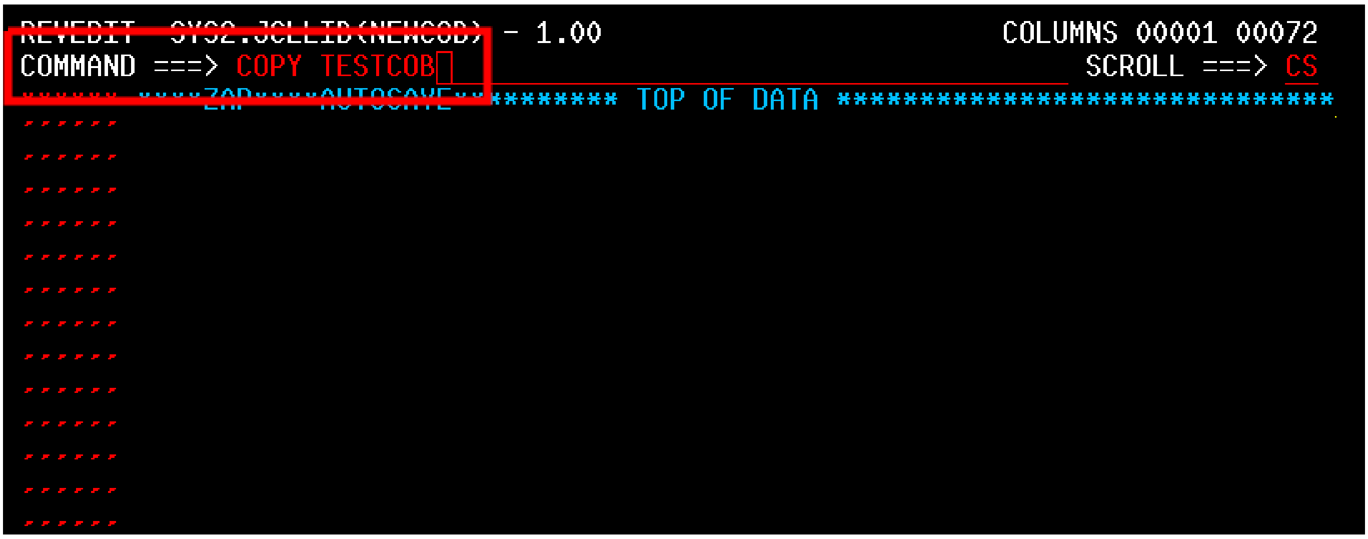
We'll be using TESTCOB as a template for our COBOL job. We don't want to use it directly, creating a copy instead. The first thing to do is to create a new, empty Data Set, with the name NEWCOB:



```
SYS2.JCLLIB on MVSRES ---------------------------------------- Row 81 of 115
Command ===> s NEWCOB                                          Scroll ===> CS
   NAME        TTR    VV.MM   CREATED      CHANGED       INIT  SIZE   MOD   ID
 . PTPCH001  000B03 80.02 74-06-14 74-06-15 14:21:00    19    19     0 HERC01
 . PTPCH002  000B05 80.01 74-06-15 74-06-15 23:40:00    19    19     0 HERC01
 . PUNPDSXM  000701
 . PWDPRINT  000C09 80.03 02-07-22 02-07-22 11:02:00    19    24     0 HERC01
 . RD#PDSXM  000703
 . READOMAT  000901
 . RECV370P  000801 01.07 13-10-01 13-10-06 12:16:23    53    69     0 HERC01
 . RECV370S  000803
 . RENMEMBR  000805
 . REVLMOD   000A0F 80.01 73-12-23 73-12-23 14:08:00     4     4     0 HERC02
 . SAVEOLD   000A01
 . SHUTDOWN  001109 01.00 13-07-15 13-07-15 22:07:00    13    13     0 SYSOPER
 . SIMUPRIM  001203 01.00 14-01-01 14-01-01 19:30:00    65    65     0 JUERGEN
```

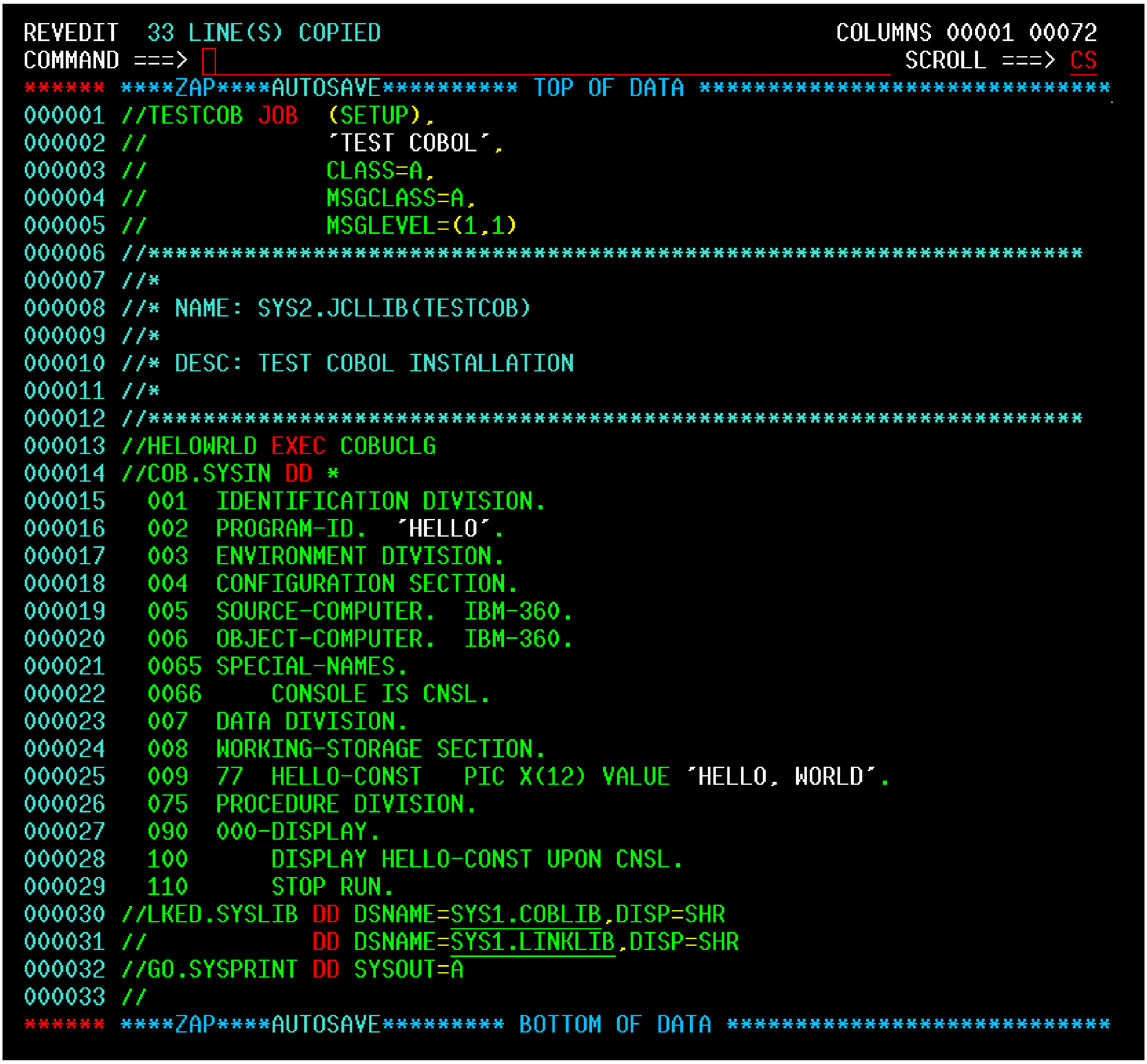
The new, empty Data Set opens in REVEDIT.

Next, we indicate that we want to populate it with a copy of the contents of TESTCOB:



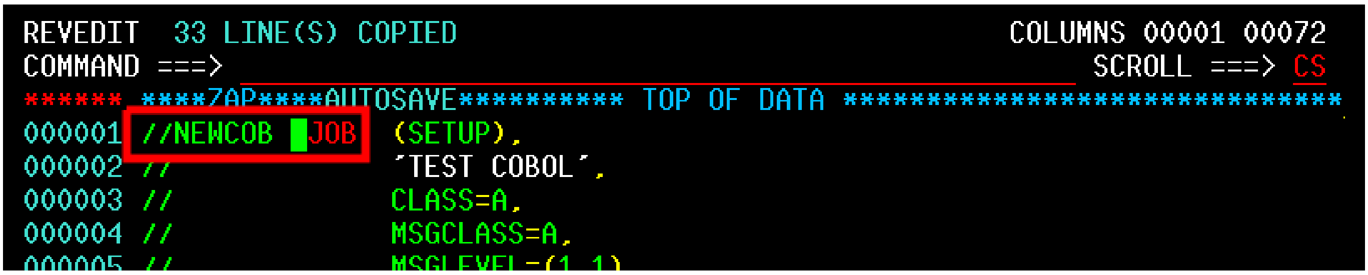
```
REVEDIT  SYS2.JCLLIB(NEWCOB) - 1.00                      COLUMNS 00001 00072
COMMAND ===> COPY TESTCOB                                      SCROLL ===> CS
****** ****ZAP****AUTOSAVE*********** TOP OF DATA ******************************
''''''
''''''
''''''
''''''
''''''
''''''
''''''
''''''
''''''
''''''
''''''
''''''
''''''
```

The editor will display the copied text:



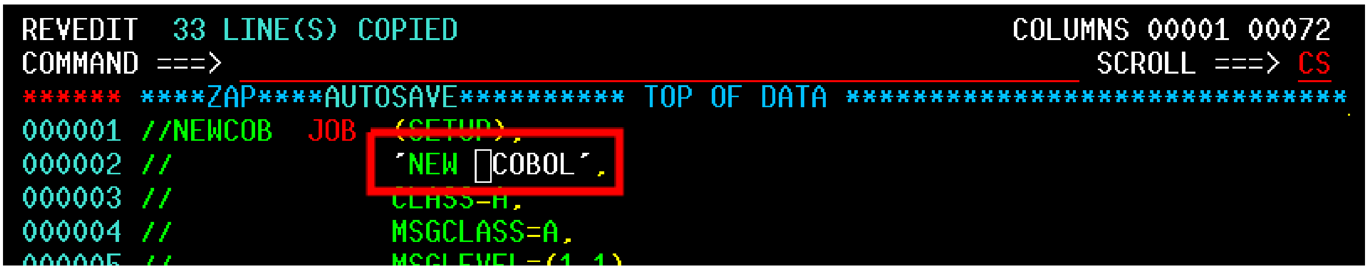
```
REVEDIT  33 LINE(S) COPIED                                 COLUMNS 00001 00072
COMMAND ===>                                                   SCROLL ===> CS
****** ****ZAP****AUTOSAVE********** TOP OF DATA ******************************
000001 //TESTCOB JOB  (SETUP),
000002 //             'TEST COBOL',
000003 //             CLASS=A,
000004 //             MSGCLASS=A,
000005 //             MSGLEVEL=(1,1)
000006 //**********************************************************************
000007 //*
000008 //* NAME: SYS2.JCLLIB(TESTCOB)
000009 //*
000010 //* DESC: TEST COBOL INSTALLATION
000011 //*
000012 //**********************************************************************
000013 //HELOWRLD EXEC COBUCLG
000014 //COB.SYSIN DD *
000015   001  IDENTIFICATION DIVISION.
000016   002  PROGRAM-ID.  'HELLO'.
000017   003  ENVIRONMENT DIVISION.
000018   004  CONFIGURATION SECTION.
000019   005  SOURCE-COMPUTER.  IBM-360.
000020   006  OBJECT-COMPUTER.  IBM-360.
000021   0065 SPECIAL-NAMES.
000022   0066     CONSOLE IS CNSL.
000023   007  DATA DIVISION.
000024   008  WORKING-STORAGE SECTION.
000025   009  77  HELLO-CONST   PIC X(12) VALUE 'HELLO, WORLD'.
000026   075  PROCEDURE DIVISION.
000027   090  000-DISPLAY.
000028   100      DISPLAY HELLO-CONST UPON CNSL.
000029   110      STOP RUN.
000030 //LKED.SYSLIB DD DSNAME=SYS1.COBLIB,DISP=SHR
000031 //             DD DSNAME=SYS1.LINKLIB,DISP=SHR
000032 //GO.SYSPRINT DD SYSOUT=A
000033 //
****** ****ZAP****AUTOSAVE********* BOTTOM OF DATA ****************************
```

Make a few edits to the copied text. First, in line 0001, change TESTCOB to NEWCOB:



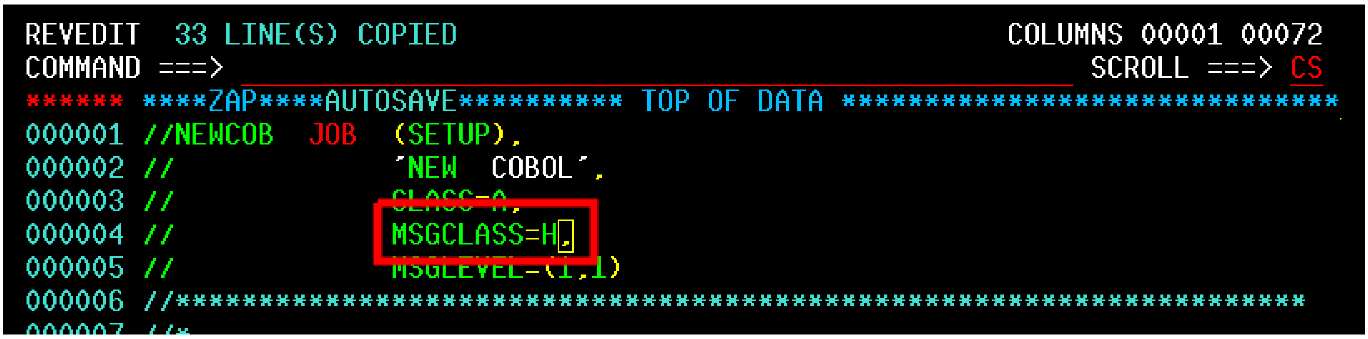
```
REVEDIT  33 LINE(S) COPIED                                 COLUMNS 00001 00072
COMMAND ===>                                                   SCROLL ===> CS
****** ****ZAP****AUTOSAVE********** TOP OF DATA ******************************
000001 //NEWCOB  JOB  (SETUP),
000002 //             'TEST COBOL',
000003 //             CLASS=A,
000004 //             MSGCLASS=A,
000005 //             MSGLEVEL=(1,1)
```

In line 0002, update the description:



```
REVEDIT  33 LINE(S) COPIED                              COLUMNS 00001 00072
COMMAND ===>                                                SCROLL ===> CS
****** ****ZAP****AUTOSAVE*********** TOP OF DATA ******************************
000001 //NEWCOB   JOB   (SETUP),
000002 //               'NEW  COBOL',
000003 //               CLASS=A,
000004 //               MSGCLASS=A,
000005 //               MSGLEVEL=(1,1)
```

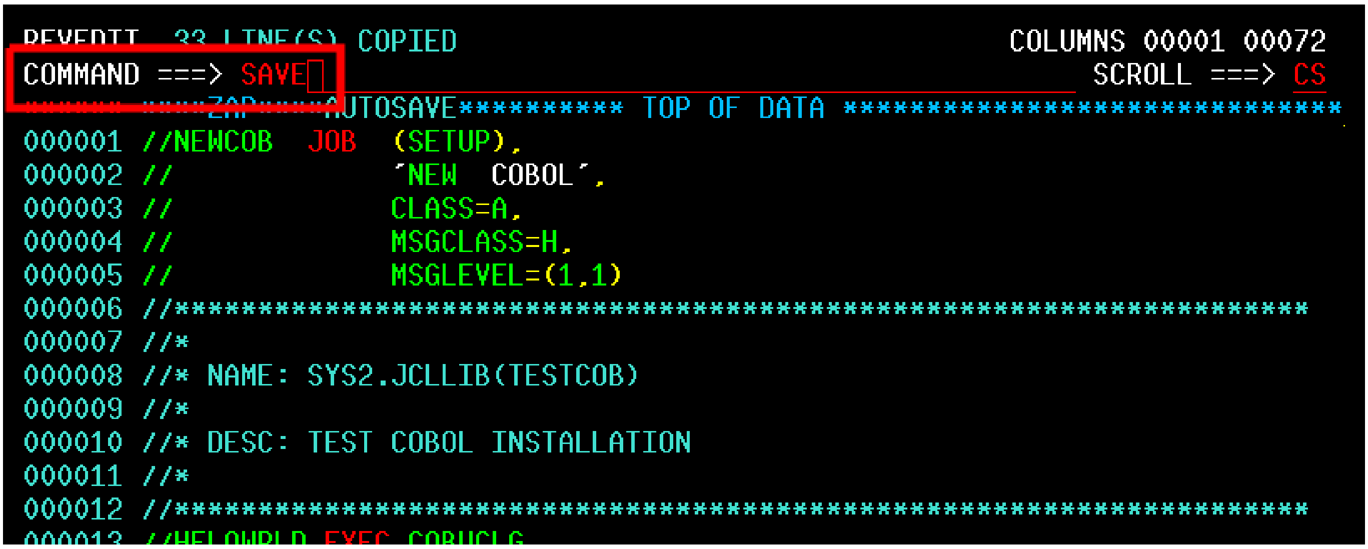
Finally, in line 0004, change the MSGCLASS to 'H':



```
REVEDIT  33 LINE(S) COPIED                              COLUMNS 00001 00072
COMMAND ===>                                                SCROLL ===> CS
****** ****ZAP****AUTOSAVE*********** TOP OF DATA ******************************
000001 //NEWCOB   JOB   (SETUP),
000002 //               'NEW  COBOL',
000003 //               CLASS=A,
000004 //               MSGCLASS=H,
000005 //               MSGLEVEL=(1,1)
000006 //*********************************************************************
000007 //*
```

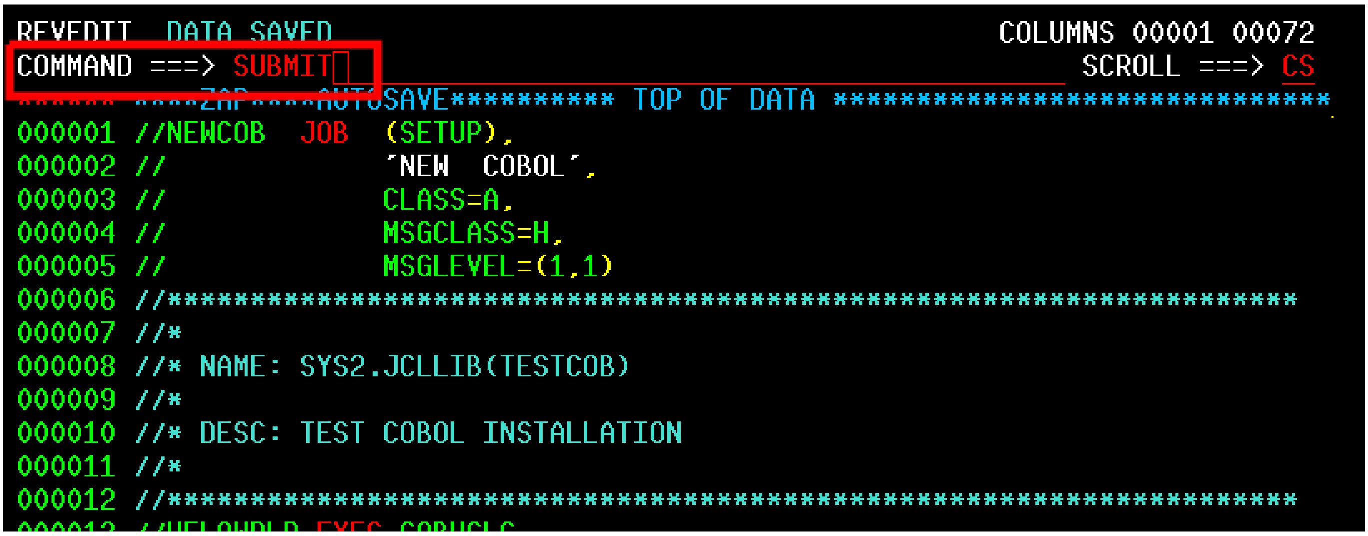
(This will ensure that the output from the job is retained and viewable after we run it)

Save your changes:



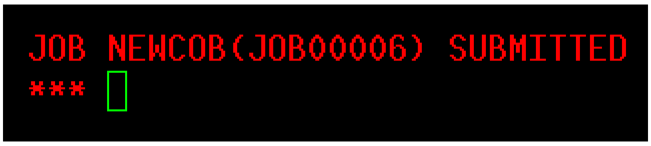
```
REVEDIT  33 LINE(S) COPIED                              COLUMNS 00001 00072
COMMAND ===> SAVE                                           SCROLL ===> CS
****** ****ZAP****AUTOSAVE*********** TOP OF DATA ******************************
000001 //NEWCOB   JOB   (SETUP),
000002 //               'NEW  COBOL',
000003 //               CLASS=A,
000004 //               MSGCLASS=H,
000005 //               MSGLEVEL=(1,1)
000006 //*********************************************************************
000007 //*
000008 //* NAME: SYS2.JCLLIB(TESTCOB)
000009 //*
000010 //* DESC: TEST COBOL INSTALLATION
000011 //*
000012 //*********************************************************************
000013 //HELOWRLD EXEC COBUCLG
```

Submit the job:



```
REVEDIT  DATA SAVED                                       COLUMNS 00001 00072
COMMAND ===> SUBMIT                                            SCROLL ===> CS
****** ****ZAP*****AUTOSAVE*********** TOP OF DATA ******************************
000001 //NEWCOB  JOB  (SETUP),
000002 //             'NEW  COBOL',
000003 //             CLASS=A,
000004 //             MSGCLASS=H,
000005 //             MSGLEVEL=(1,1)
000006 //**********************************************************************
000007 //*
000008 //* NAME: SYS2.JCLLIB(TESTCOB)
000009 //*
000010 //* DESC: TEST COBOL INSTALLATION
000011 //*
000012 //**********************************************************************
000013 //HELLOWRLD EXEC COBUCLG
```

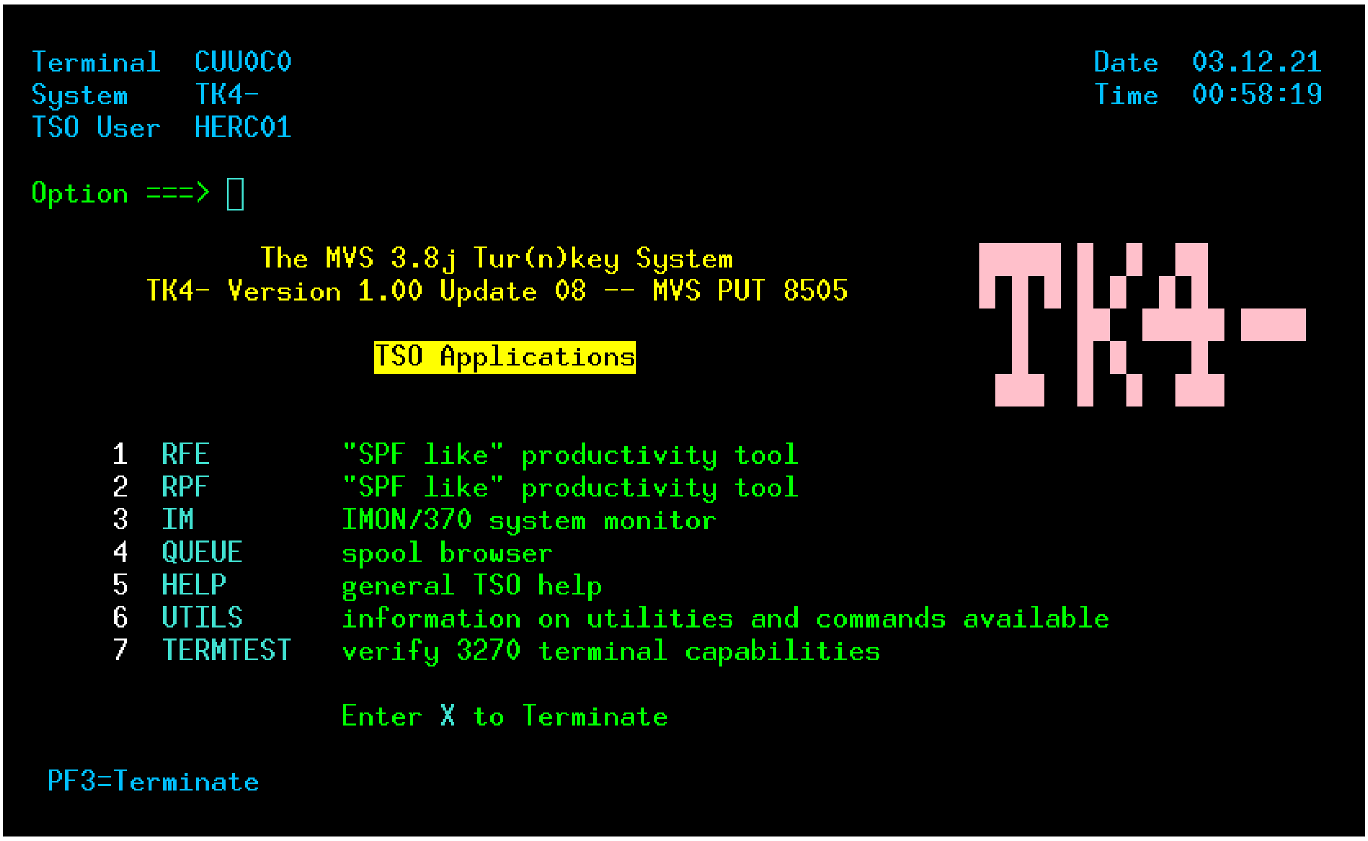
You’ll see a confirmation message, indicating that the job has been submitted:



```
JOB NEWCOB(JOB00006) SUBMITTED
***
```

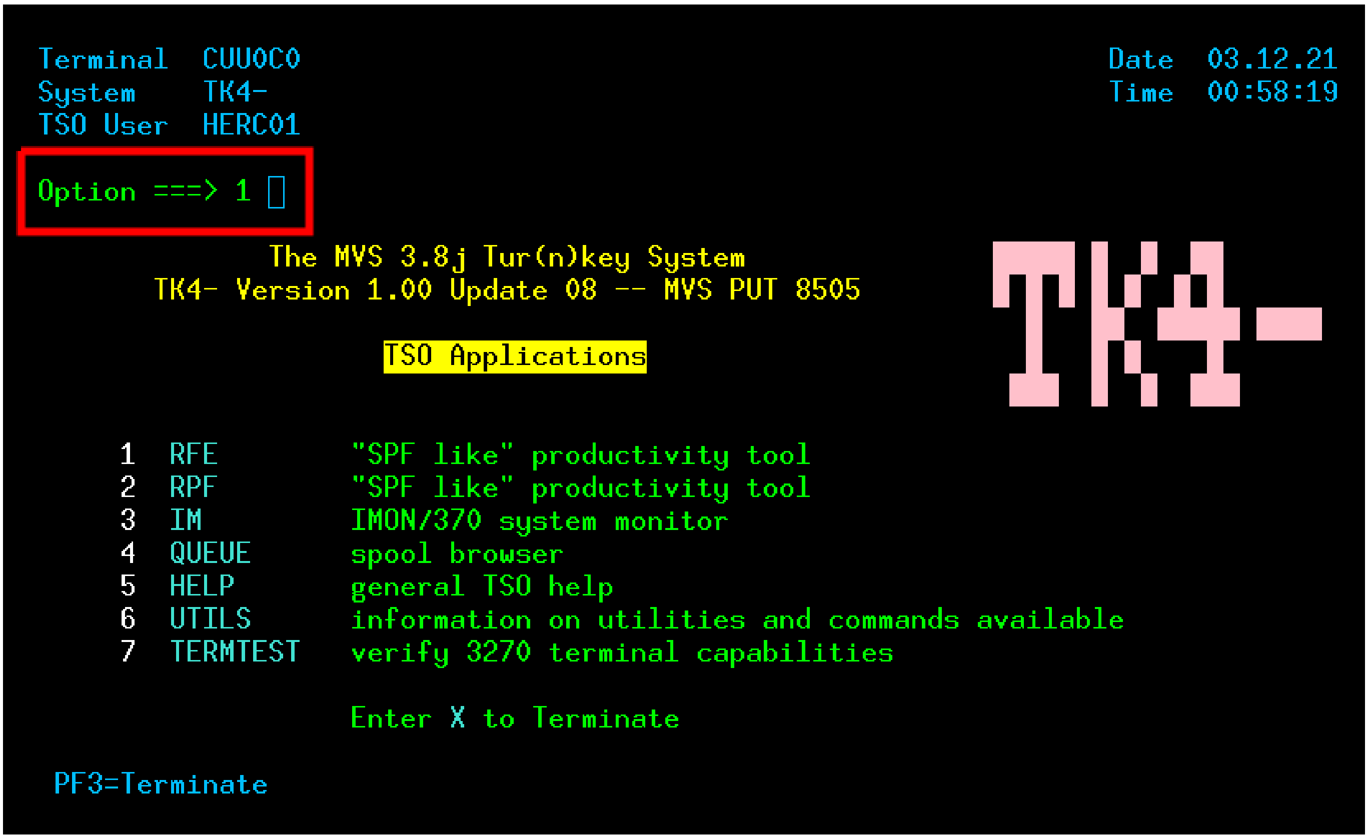
Check the Results

If you aren’t already on the main screen, press [F3] until it’s displayed:



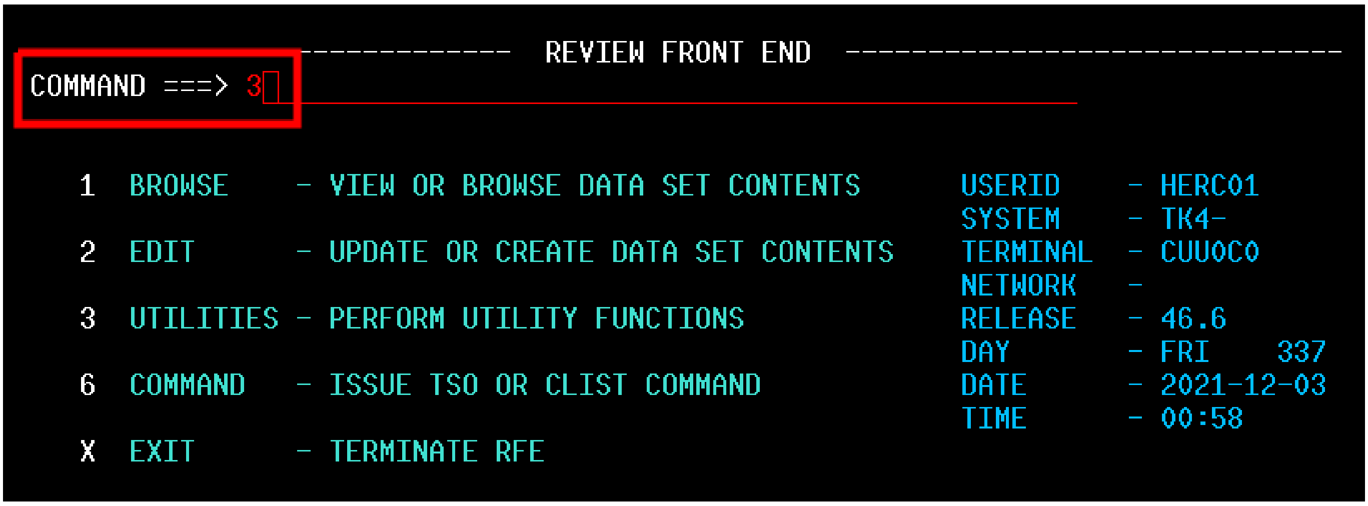
```
Terminal   CUU0C0                                          Date  03.12.21
System     TK4-                                            Time  00:58:19
TSO User   HERC01

Option ===>

          The MVS 3.8j Tur(n)key System
      TK4- Version 1.00 Update 08 -- MVS PUT 8505

                   TSO Applications


    1  RFE         "SPF like" productivity tool
    2  RPF         "SPF like" productivity tool
    3  IM          IMON/370 system monitor
    4  QUEUE       spool browser
    5  HELP        general TSO help
    6  UTILS       information on utilities and commands available
    7  TERMTEST    verify 3270 terminal capabilities

                   Enter X to Terminate

 PF3=Terminate
```

Enter '1' to access the RFE tool:



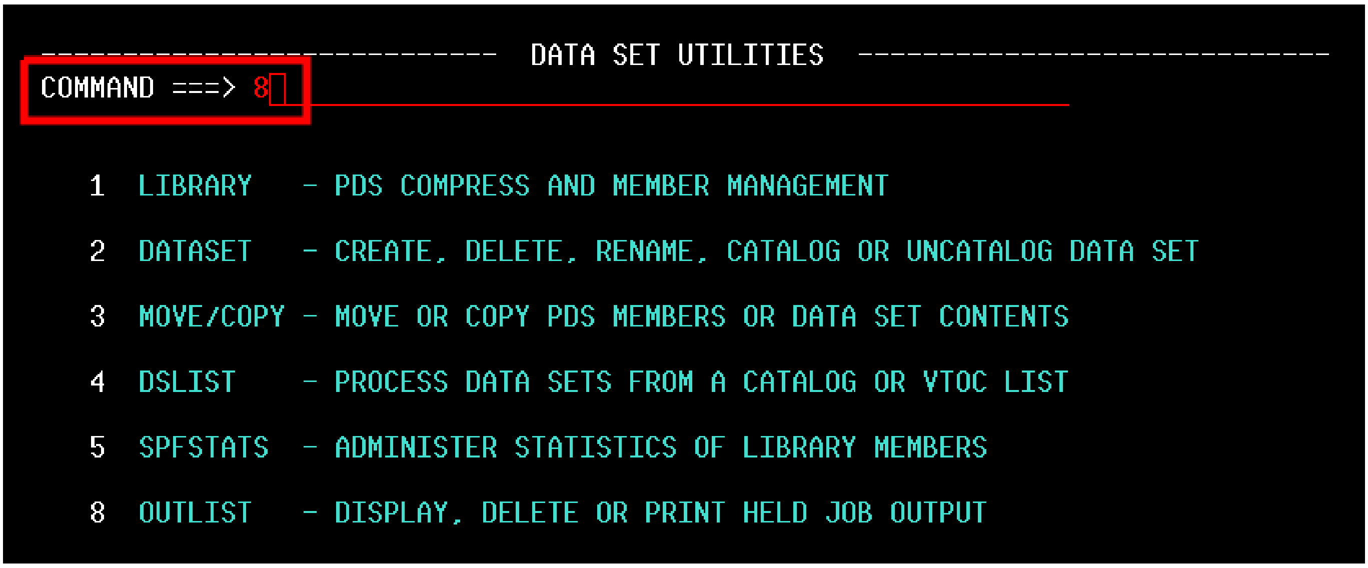
```
 Terminal  CUU0C0                                              Date  03.12.21
 System    TK4-                                                Time  00:58:19
 TSO User  HERC01

 Option ===> 1

                The MVS 3.8j Tur(n)key System
         TK4- Version 1.00 Update 08 -- MVS PUT 8505

                       TSO Applications


      1  RFE         "SPF like" productivity tool
      2  RPF         "SPF like" productivity tool
      3  IM          IMON/370 system monitor
      4  QUEUE       spool browser
      5  HELP        general TSO help
      6  UTILS       information on utilities and commands available
      7  TERMTEST    verify 3270 terminal capabilities

                     Enter X to Terminate

  PF3=Terminate
```

Enter '3' to access utility functions:



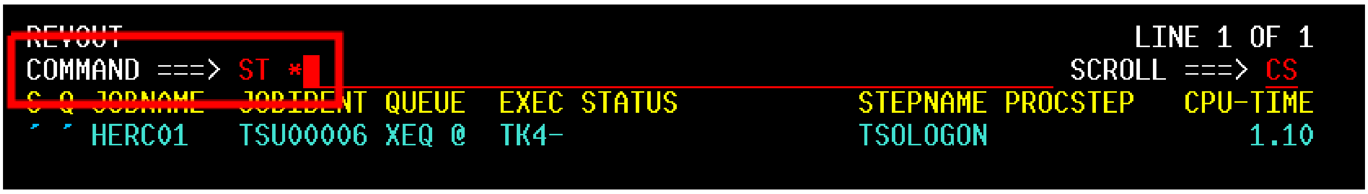
```
------------------------  REVIEW FRONT END  ------------------------------
COMMAND ===> 3

   1  BROWSE    - VIEW OR BROWSE DATA SET CONTENTS     USERID    - HERC01
                                                        SYSTEM    - TK4-
   2  EDIT      - UPDATE OR CREATE DATA SET CONTENTS   TERMINAL  - CUU0C0
                                                        NETWORK   -
   3  UTILITIES - PERFORM UTILITY FUNCTIONS            RELEASE   - 46.6
                                                        DAY       - FRI    337
   6  COMMAND   - ISSUE TSO OR CLIST COMMAND           DATE      - 2021-12-03
                                                        TIME      - 00:58
   X  EXIT      - TERMINATE RFE
```

Enter '8' to access held job output:



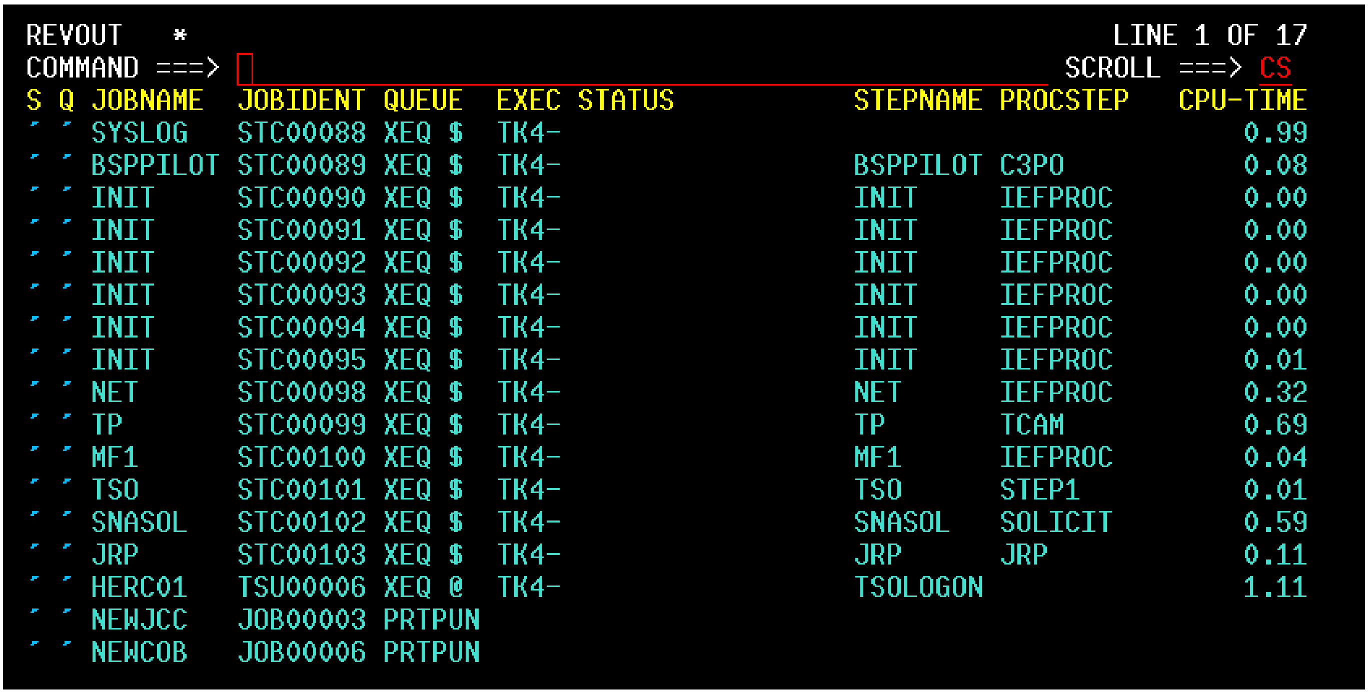
```
 ----------------------------  DATA SET UTILITIES  -----------------------------
 COMMAND ===> 8

     1  LIBRARY   - PDS COMPRESS AND MEMBER MANAGEMENT

     2  DATASET   - CREATE, DELETE, RENAME, CATALOG OR UNCATALOG DATA SET

     3  MOVE/COPY - MOVE OR COPY PDS MEMBERS OR DATA SET CONTENTS

     4  DSLIST    - PROCESS DATA SETS FROM A CATALOG OR VTOC LIST

     5  SPFSTATS  - ADMINISTER STATISTICS OF LIBRARY MEMBERS

     8  OUTLIST   - DISPLAY, DELETE OR PRINT HELD JOB OUTPUT
```

Enter 'ST *', indicating that you want to display all held jobs:



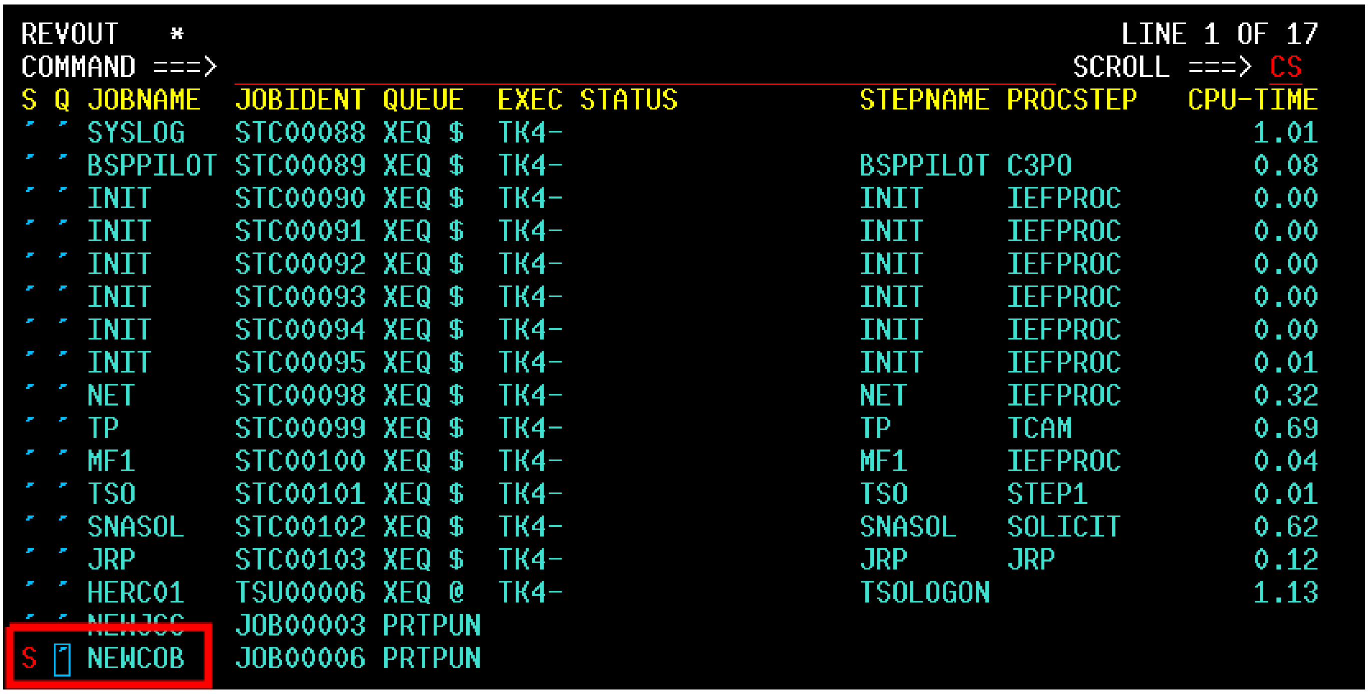
```
REVOUT                                                                LINE 1 OF 1
COMMAND ===> ST *                                                  SCROLL ===> CS
S Q JOBNAME  JOBIDENT QUEUE  EXEC STATUS           STEPNAME PROCSTEP    CPU-TIME
' ' HERC01   TSU00006 XEQ @  TK4-                  TSOLOGON                 1.10
```

You'll see 'NEWCOB', the job you recently submitted, at the end of the list:



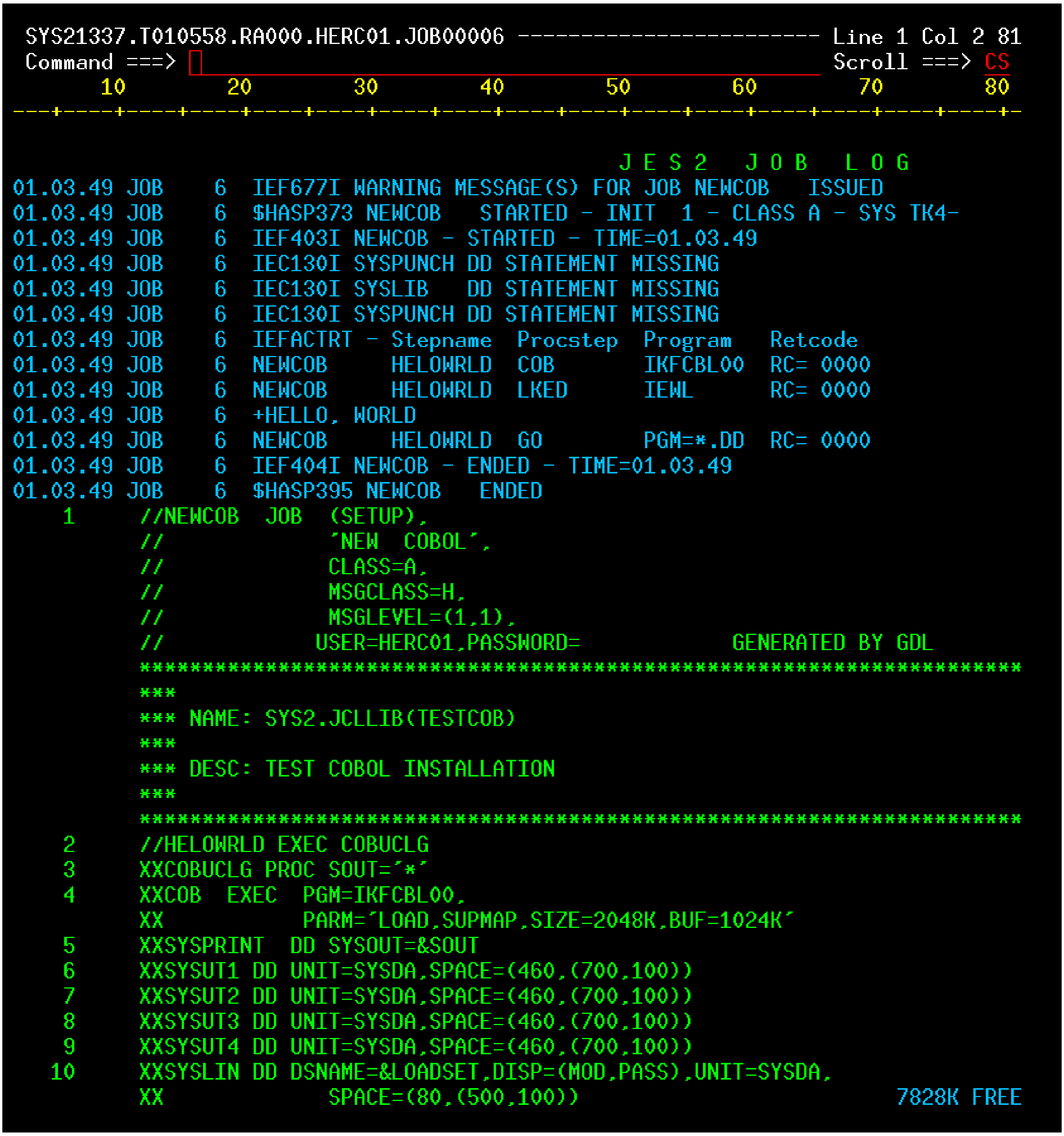
```
REVOUT   *                                                           LINE 1 OF 17
COMMAND ===>                                                       SCROLL ===> CS
S Q JOBNAME  JOBIDENT QUEUE  EXEC STATUS           STEPNAME PROCSTEP    CPU-TIME
' ' SYSLOG   STC00088 XEQ $  TK4-                                           0.99
' ' BSPPILOT STC00089 XEQ $  TK4-                  BSPPILOT C3PO            0.08
' ' INIT     STC00090 XEQ $  TK4-                  INIT     IEFPROC         0.00
' ' INIT     STC00091 XEQ $  TK4-                  INIT     IEFPROC         0.00
' ' INIT     STC00092 XEQ $  TK4-                  INIT     IEFPROC         0.00
' ' INIT     STC00093 XEQ $  TK4-                  INIT     IEFPROC         0.00
' ' INIT     STC00094 XEQ $  TK4-                  INIT     IEFPROC         0.00
' ' INIT     STC00095 XEQ $  TK4-                  INIT     IEFPROC         0.01
' ' NET      STC00098 XEQ $  TK4-                  NET      IEFPROC         0.32
' ' TP       STC00099 XEQ $  TK4-                  TP       TCAM            0.69
' ' MF1      STC00100 XEQ $  TK4-                  MF1      IEFPROC         0.04
' ' TSO      STC00101 XEQ $  TK4-                  TSO      STEP1           0.01
' ' SNASOL   STC00102 XEQ $  TK4-                  SNASOL   SOLICIT         0.59
' ' JRP      STC00103 XEQ $  TK4-                  JRP      JRP             0.11
' ' HERC01   TSU00006 XEQ @  TK4-                  TSOLOGON                 1.11
' ' NEWJCC   JOB00003 PRTPUN
' ' NEWCOB   JOB00006 PRTPUN
```

Enter 'S' in the S column for the NEWCOB job:



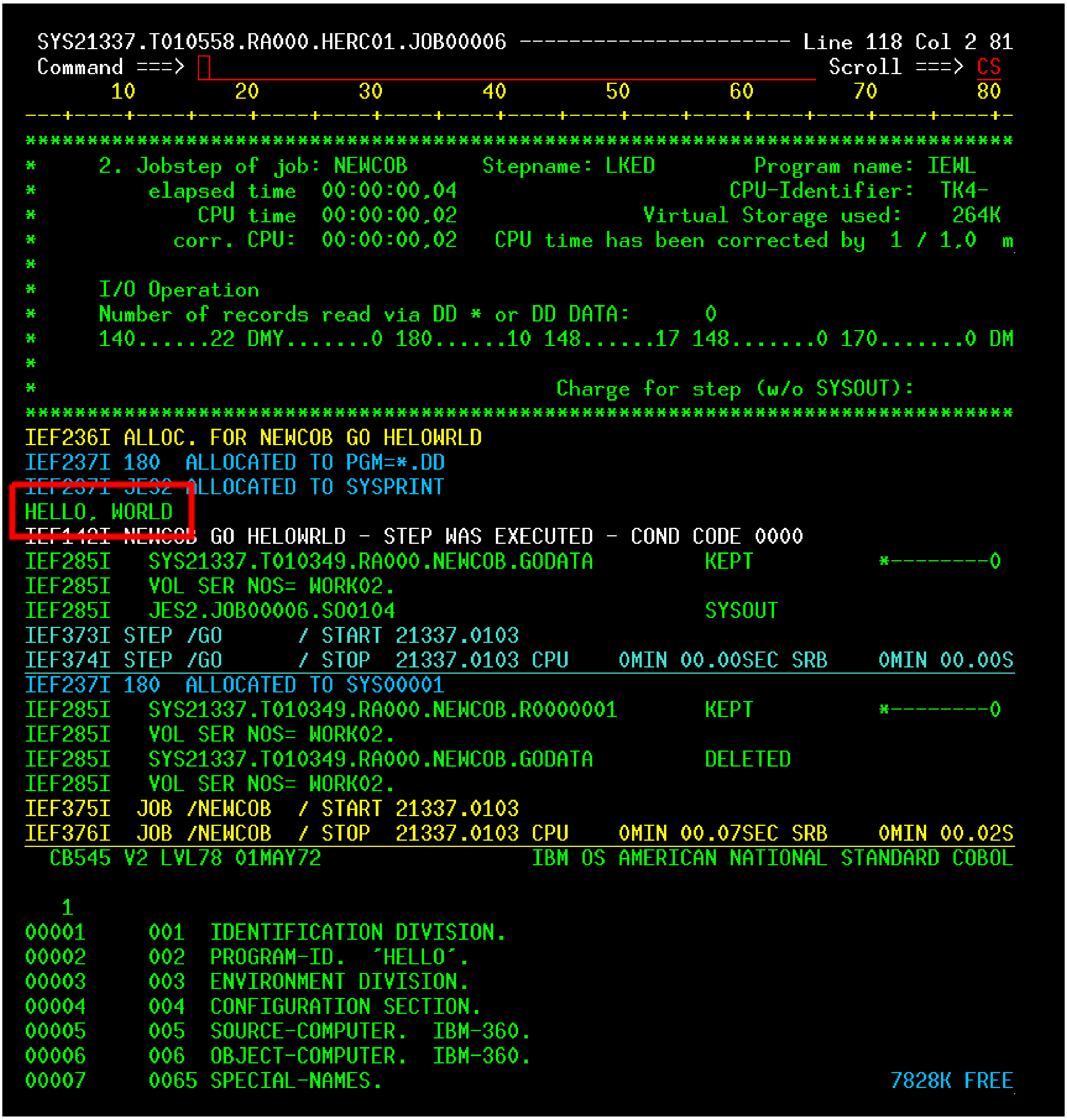
```
REVOUT    *                                                       LINE 1 OF 17
COMMAND ===>                                                   SCROLL ===> CS
S Q JOBNAME  JOBIDENT QUEUE  EXEC STATUS          STEPNAME PROCSTEP   CPU-TIME
    SYSLOG   STC00088 XEQ $  TK4-                                         1.01
    BSPPILOT STC00089 XEQ $  TK4-                 BSPPILOT C3PO           0.08
    INIT     STC00090 XEQ $  TK4-                 INIT     IEFPROC        0.00
    INIT     STC00091 XEQ $  TK4-                 INIT     IEFPROC        0.00
    INIT     STC00092 XEQ $  TK4-                 INIT     IEFPROC        0.00
    INIT     STC00093 XEQ $  TK4-                 INIT     IEFPROC        0.00
    INIT     STC00094 XEQ $  TK4-                 INIT     IEFPROC        0.00
    INIT     STC00095 XEQ $  TK4-                 INIT     IEFPROC        0.01
    NET      STC00098 XEQ $  TK4-                 NET      IEFPROC        0.32
    TP       STC00099 XEQ $  TK4-                 TP       TCAM           0.69
    MF1      STC00100 XEQ $  TK4-                 MF1      IEFPROC        0.04
    TSO      STC00101 XEQ $  TK4-                 TSO      STEP1          0.01
    SNASOL   STC00102 XEQ $  TK4-                 SNASOL   SOLICIT        0.62
    JRP      STC00103 XEQ $  TK4-                 JRP      JRP            0.12
    HERC01   TSU00006 XEQ @  TK4-                 TSOLOGON                1.13
    NEWJCC   JOB00003 PRTPUN
S   NEWCOB   JOB00006 PRTPUN
```

Job output is displayed:



```
 SYS21337.T010558.RA000.HERC01.JOB00006 ------------------------ Line 1 Col 2 81
 Command ===>                                                     Scroll ===> CS
         10        20        30        40        50        60        70        80
---+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+-

                                                J E S 2   J O B   L O G
01.03.49 JOB    6  IEF677I WARNING MESSAGE(S) FOR JOB NEWCOB   ISSUED
01.03.49 JOB    6  $HASP373 NEWCOB   STARTED - INIT  1 - CLASS A - SYS TK4-
01.03.49 JOB    6  IEF403I NEWCOB - STARTED - TIME=01.03.49
01.03.49 JOB    6  IEC130I SYSPUNCH DD STATEMENT MISSING
01.03.49 JOB    6  IEC130I SYSLIB   DD STATEMENT MISSING
01.03.49 JOB    6  IEC130I SYSPUNCH DD STATEMENT MISSING
01.03.49 JOB    6  IEFACTRT - Stepname  Procstep  Program   Retcode
01.03.49 JOB    6  NEWCOB     HELOWRLD  COB       IKFCBL00  RC= 0000
01.03.49 JOB    6  NEWCOB     HELOWRLD  LKED      IEWL      RC= 0000
01.03.49 JOB    6  +HELLO, WORLD
01.03.49 JOB    6  NEWCOB     HELOWRLD  GO        PGM=*.DD  RC= 0000
01.03.49 JOB    6  IEF404I NEWCOB - ENDED - TIME=01.03.49
01.03.49 JOB    6  $HASP395 NEWCOB   ENDED
    1     //NEWCOB  JOB  (SETUP),
          //             'NEW  COBOL',
          //             CLASS=A,
          //             MSGCLASS=H,
          //             MSGLEVEL=(1,1),
          //            USER=HERC01,PASSWORD=            GENERATED BY GDL
          **********************************************************************
          ***
          *** NAME: SYS2.JCLLIB(TESTCOB)
          ***
          *** DESC: TEST COBOL INSTALLATION
          ***
          **********************************************************************
    2     //HELOWRLD EXEC COBUCLG
    3     XXCOBUCLG PROC SOUT='*'
    4     XXCOB   EXEC  PGM=IKFCBL00,
          XX            PARM='LOAD,SUPMAP,SIZE=2048K,BUF=1024K'
    5     XXSYSPRINT  DD SYSOUT=&SOUT
    6     XXSYSUT1 DD UNIT=SYSDA,SPACE=(460,(700,100))
    7     XXSYSUT2 DD UNIT=SYSDA,SPACE=(460,(700,100))
    8     XXSYSUT3 DD UNIT=SYSDA,SPACE=(460,(700,100))
    9     XXSYSUT4 DD UNIT=SYSDA,SPACE=(460,(700,100))
   10     XXSYSLIN DD DSNAME=&LOADSET,DISP=(MOD,PASS),UNIT=SYSDA,
          XX             SPACE=(80,(500,100))                          7828K FREE
```

Press [F8] to page down, and you’ll see the 'Hello World' output:



```
  SYS21337.T010558.RA000.HERC01.JOB00006 ---------------------- Line 118 Col 2 81
  Command ===>                                                 Scroll ===> CS
        10        20        30        40        50        60        70        80
---+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+-
********************************************************************************
*     2. Jobstep of job: NEWCOB      Stepname: LKED        Program name: IEWL
*         elapsed time  00:00:00,04                      CPU-Identifier:  TK4-
*             CPU time  00:00:00,02               Virtual Storage used:    264K
*           corr. CPU:  00:00:00,02   CPU time has been corrected by  1 / 1,0  m
*
*     I/O Operation
*     Number of records read via DD * or DD DATA:      0
*     140......22 DMY.......0 180......10 148......17 148.......0 170.......0 DM
*
*                                                Charge for step (w/o SYSOUT):
********************************************************************************
IEF236I ALLOC. FOR NEWCOB GO HELOWRLD
IEF237I 180  ALLOCATED TO PGM=*.DD
IEF237I JES2 ALLOCATED TO SYSPRINT
HELLO, WORLD
IEF142I NEWCOB GO HELOWRLD - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS21337.T010349.RA000.NEWCOB.GODATA         KEPT          *--------0
IEF285I   VOL SER NOS= WORK02.
IEF285I   JES2.JOB00006.S00104                         SYSOUT
IEF373I STEP /GO      / START 21337.0103
IEF374I STEP /GO      / STOP  21337.0103 CPU    0MIN 00.00SEC SRB    0MIN 00.00S
IEF237I 180  ALLOCATED TO SYS00001
IEF285I   SYS21337.T010349.RA000.NEWCOB.R0000001       KEPT          *--------0
IEF285I   VOL SER NOS= WORK02.
IEF285I   SYS21337.T010349.RA000.NEWCOB.GODATA         DELETED
IEF285I   VOL SER NOS= WORK02.
IEF375I  JOB /NEWCOB  / START 21337.0103
IEF376I  JOB /NEWCOB  / STOP  21337.0103 CPU    0MIN 00.07SEC SRB    0MIN 00.02S
  CB545 V2 LVL78 01MAY72                 IBM OS AMERICAN NATIONAL STANDARD COBOL

   1
00001     001  IDENTIFICATION DIVISION.
00002     002  PROGRAM-ID.  'HELLO'.
00003     003  ENVIRONMENT DIVISION.
00004     004  CONFIGURATION SECTION.
00005     005  SOURCE-COMPUTER.  IBM-360.
00006     006  OBJECT-COMPUTER.  IBM-360.
00007     0065 SPECIAL-NAMES.                                              7828K FREE
```

Press [F3] several times to return to the main screen.

FORTRAN

FORTRAN first appeared in 1957. The latest stable release was in 2018. It's widely used in scientific and engineering applications.

Follow the COBOL instructions, with the following differences:

1. Copy 'TESTFORT' instead of 'TESTCOB', and name it 'NEWFORT' instead of 'NEWCOB'.
2. When you edit NEWFORT, change the job name and description to indicate NEWFORT instead of

NEWCOB.

PL/1

You may also see the name written as 'PL/I'. It first appeared in 1964, and the latest stable release was in 2019.

Follow the COBOL instructions, with the following differences:

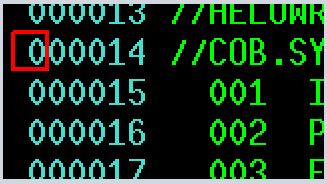
1. Copy 'TESTPL1' instead of 'TESTCOB', and name it 'NEWPL1' instead of 'NEWCOB'.
2. When you edit NEWPL1, change the job name and description to indicate NEWPL1 instead of NEWCOB.

There's an additional change, and it's important:

There's a critical "gotcha" in Pl/1 programs. MVS requires a JOBLIB statement in the JCL, and it's not included in the turnkey sample programs. The following additional line is required in the Data Set. This should be added as a new line at the end of the JCL section:

```
//JOBLIB DD DSN=SYS1.PL1LIB,DISP=SHR
```

To add a new line in the editor, enter an 'I' in the first column of a row, and the new row will be inserted after. Example location:



```
000013 //HELOWR
000014 //COB.SY
000015    001  I
000016    002  P
000017    003  F
```

You can also delete a line by entering a 'D' in the same location.

C

C first appeared in 1972, and the latest stable release was in 2018. It's the most actively used "old language" by far, heavily used in operating system and kernel development, device drivers, and embedded development.

It’s a dangerous language: Memory management is tricky. But, it’s also extremely powerful, as it’s well suited for getting close to the hardware.

Follow the COBOL instructions, with the following differences:

1. Copy 'TESTJCC' instead of 'TESTCOB', and name it 'NEWJCC' instead of 'NEWCOB'. **Use TESTJCC as your copy source, not TESTGCC. The GCC compiler ABENDs (throws an error) in the MVS Turnkey system.**
2. When you edit NEWJCC, change the job name and description to indicate NEWJCC instead of NEWCOB.

mainframe, retro

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