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.

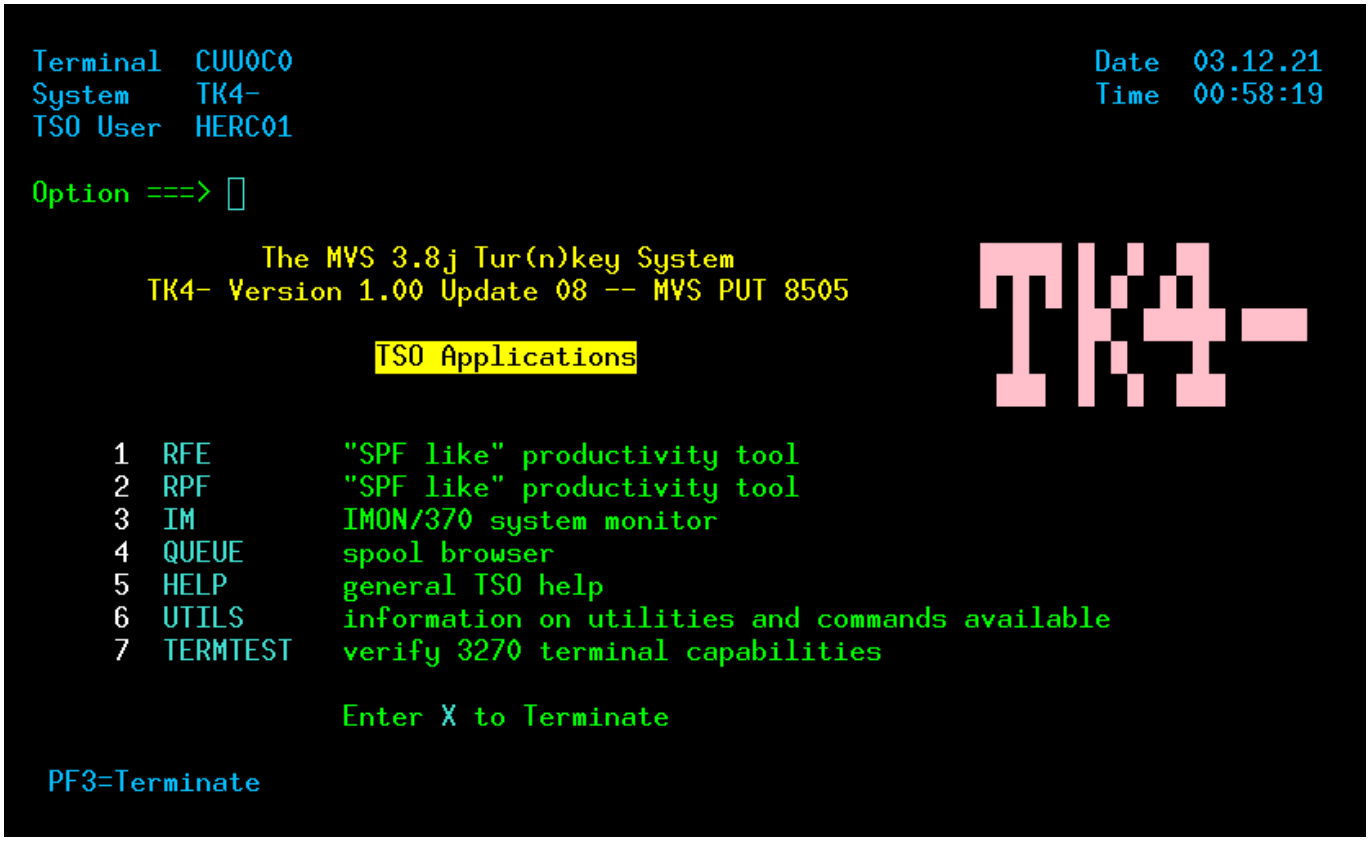
COBOL

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

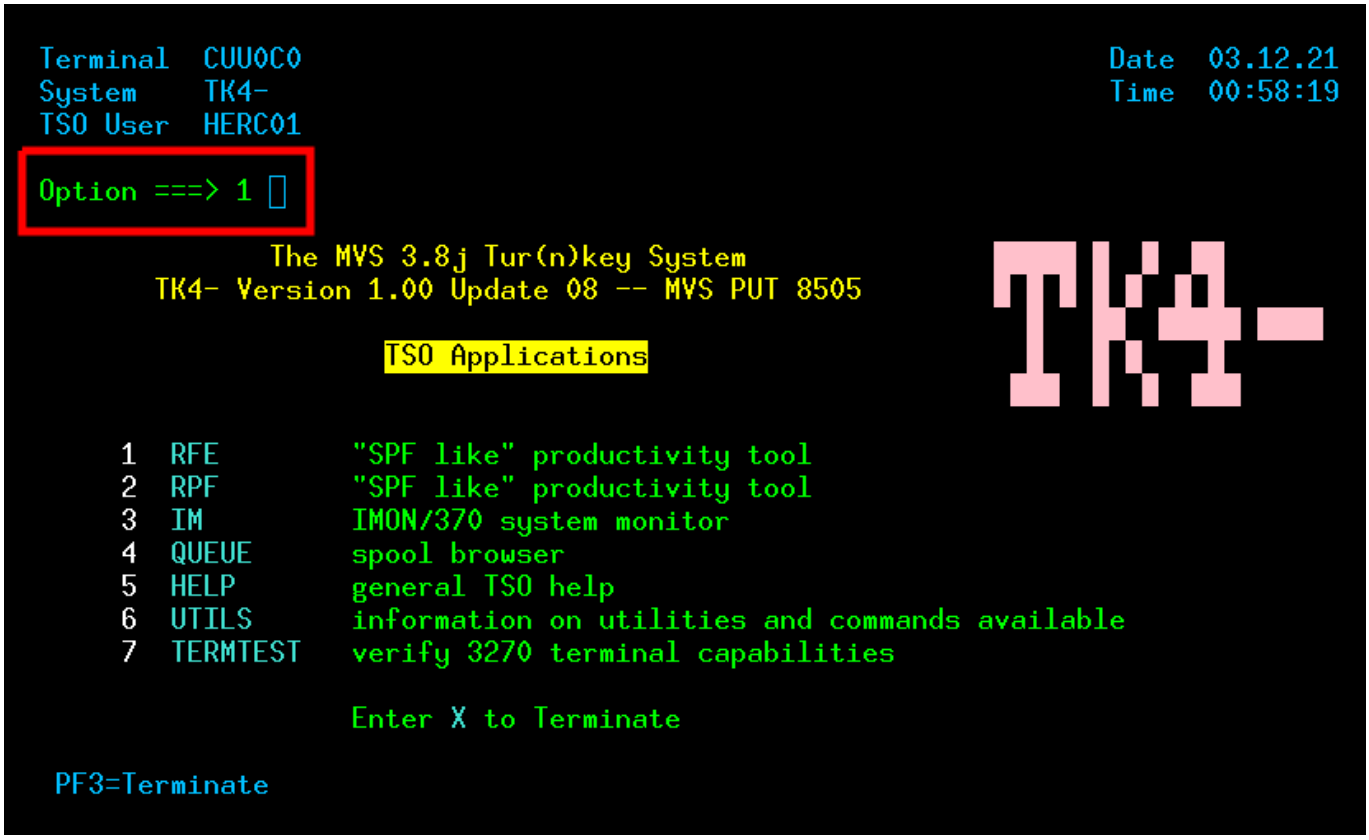
COBOL is still widely deployed. For example, as of 2017, about 95 percent of ATM swipes use COBOL code, and it powers 80 percent of in-person transactions.

Create and Submit the Job

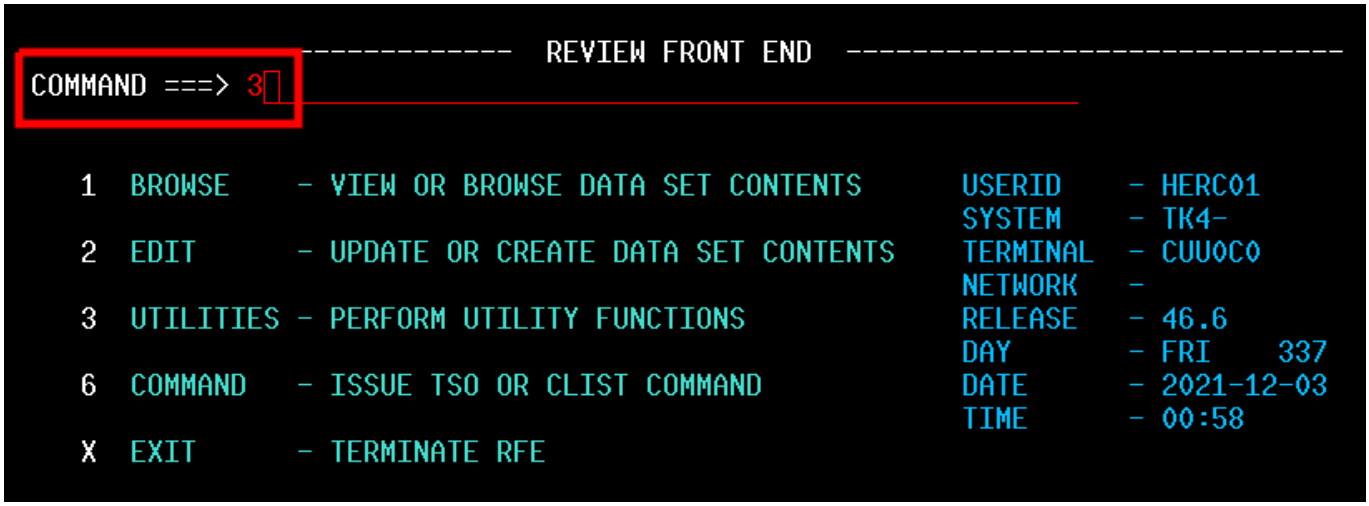
Your starting point should be the main screen:



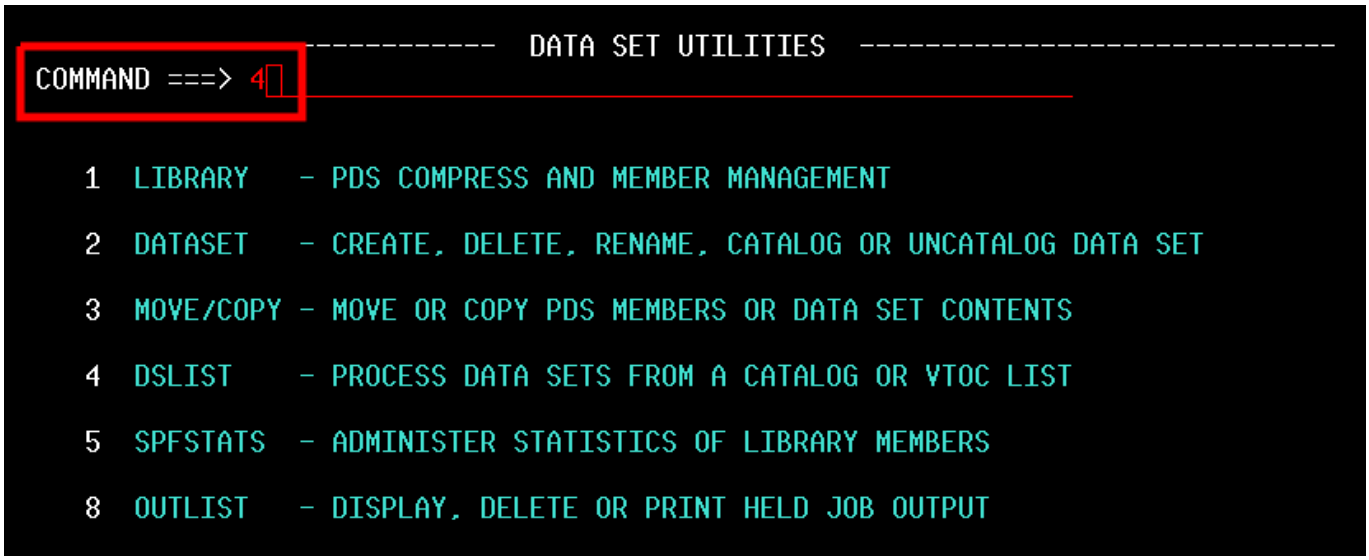
Enter '1' to access the RFE tool:



Enter '3' to access utility functions:

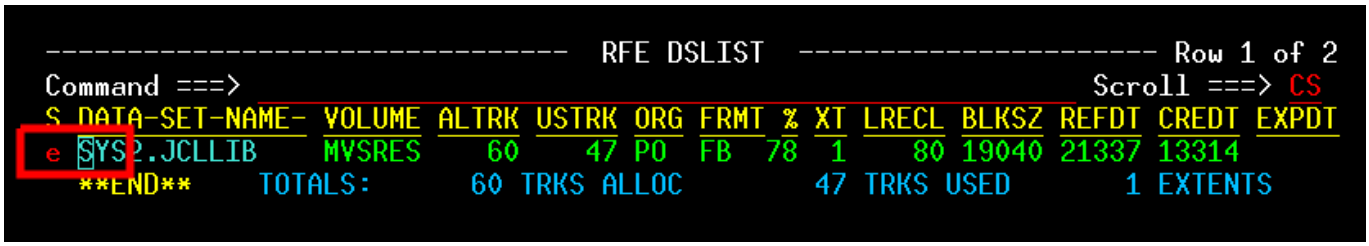


Enter '4' to access the Data Set list:

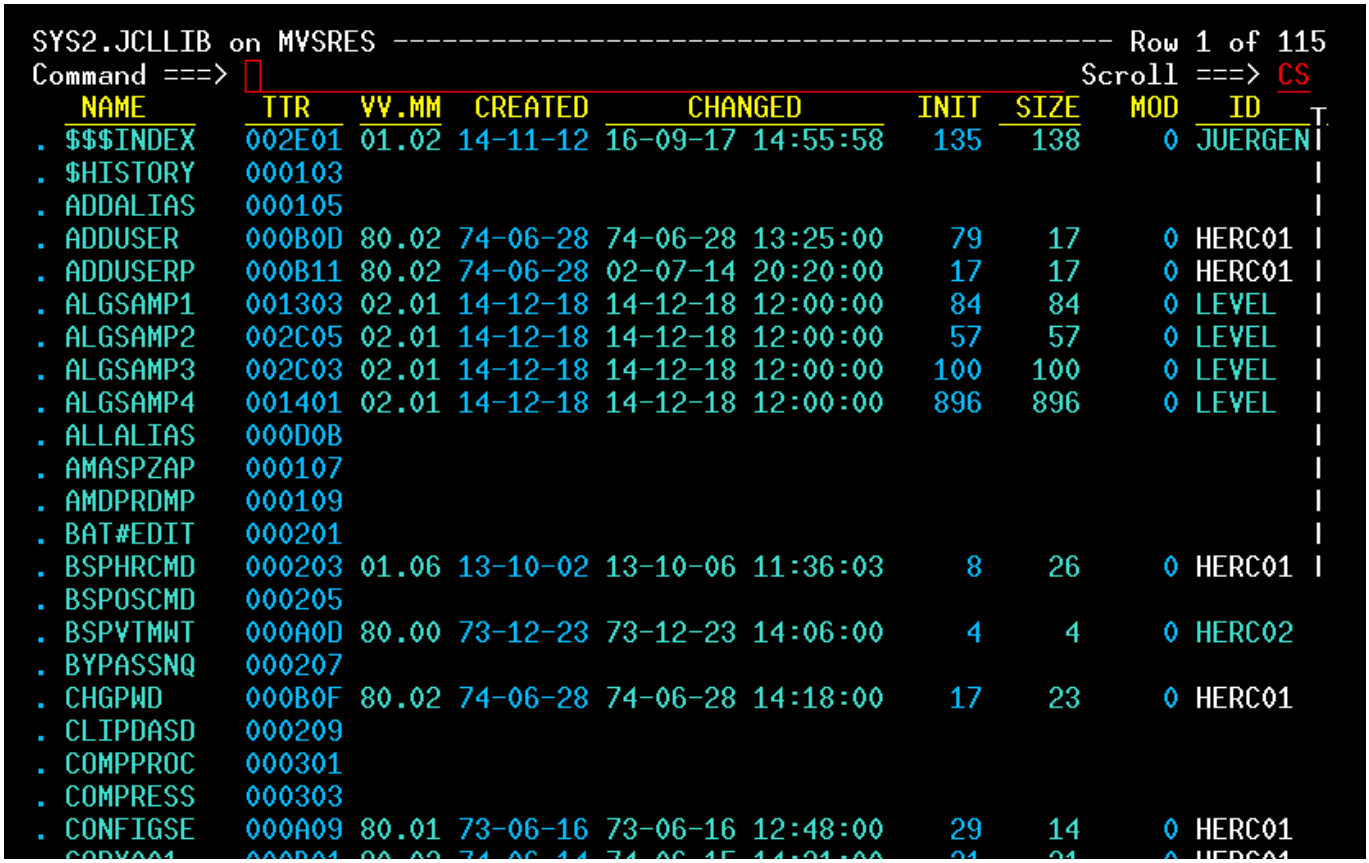


Enter 'SYS2.JCLLIB' to filter the Data Set list:

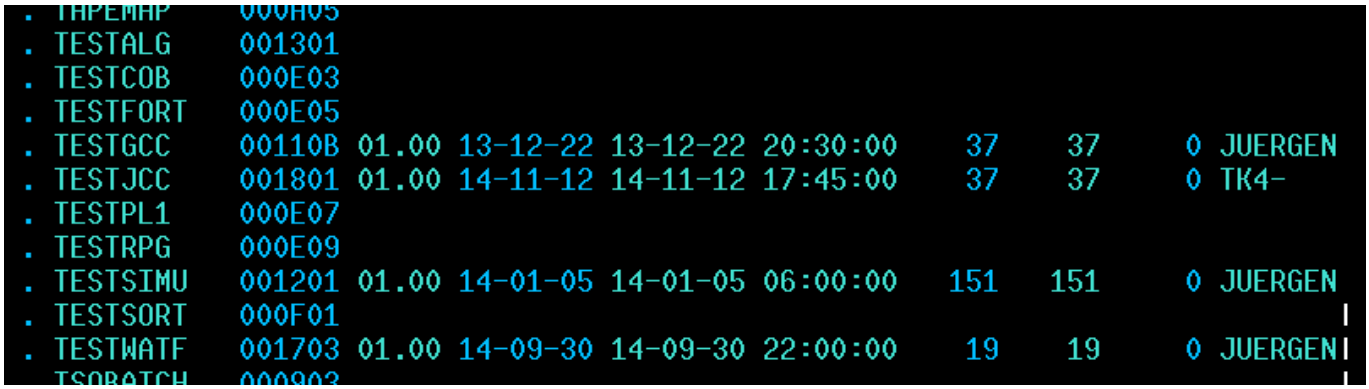
Tab to the detail line for SYS2.JCLLIB, then enter 'e' in the S column, for Edit:



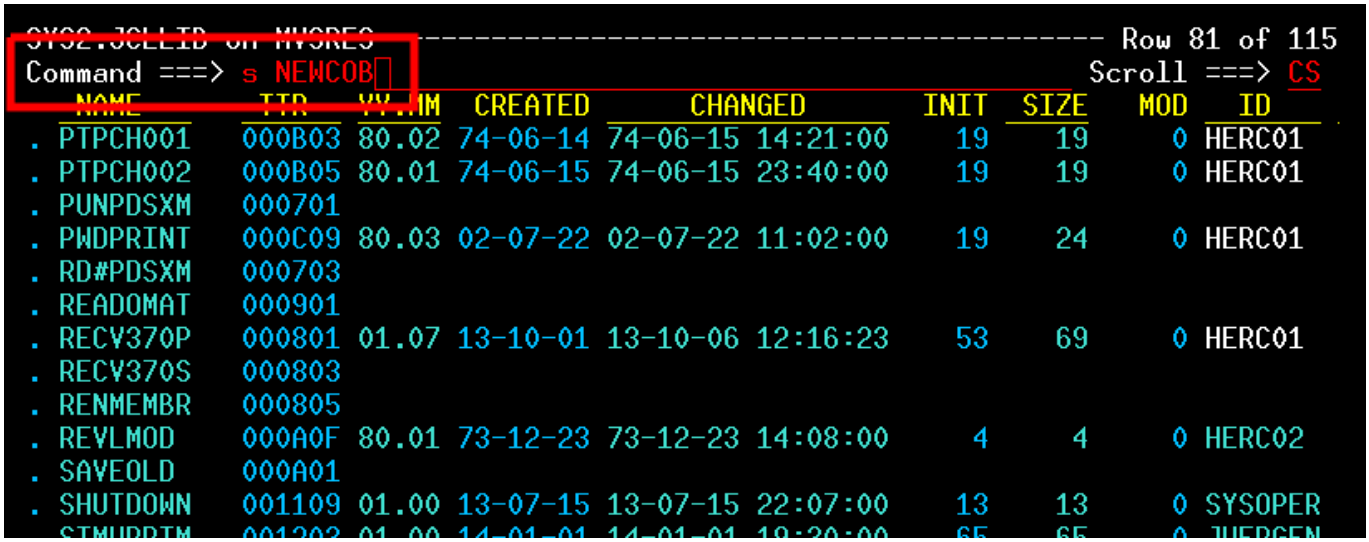
The Data Set list will display:



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:

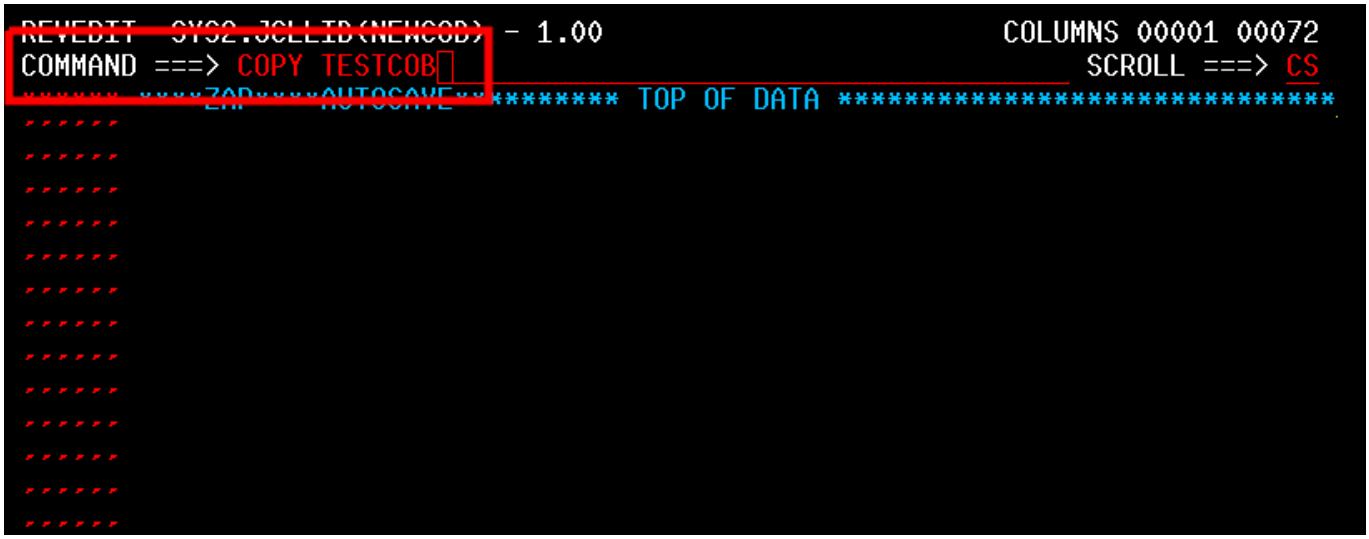


We'll be using TESTCOB as a template for our COBOL job. We don't want to use it directly, creating a copy instead. The first thing to do is to create a new, empty Data Set, with the name NEWCOB:



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:



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 //*********************************************************************
```

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

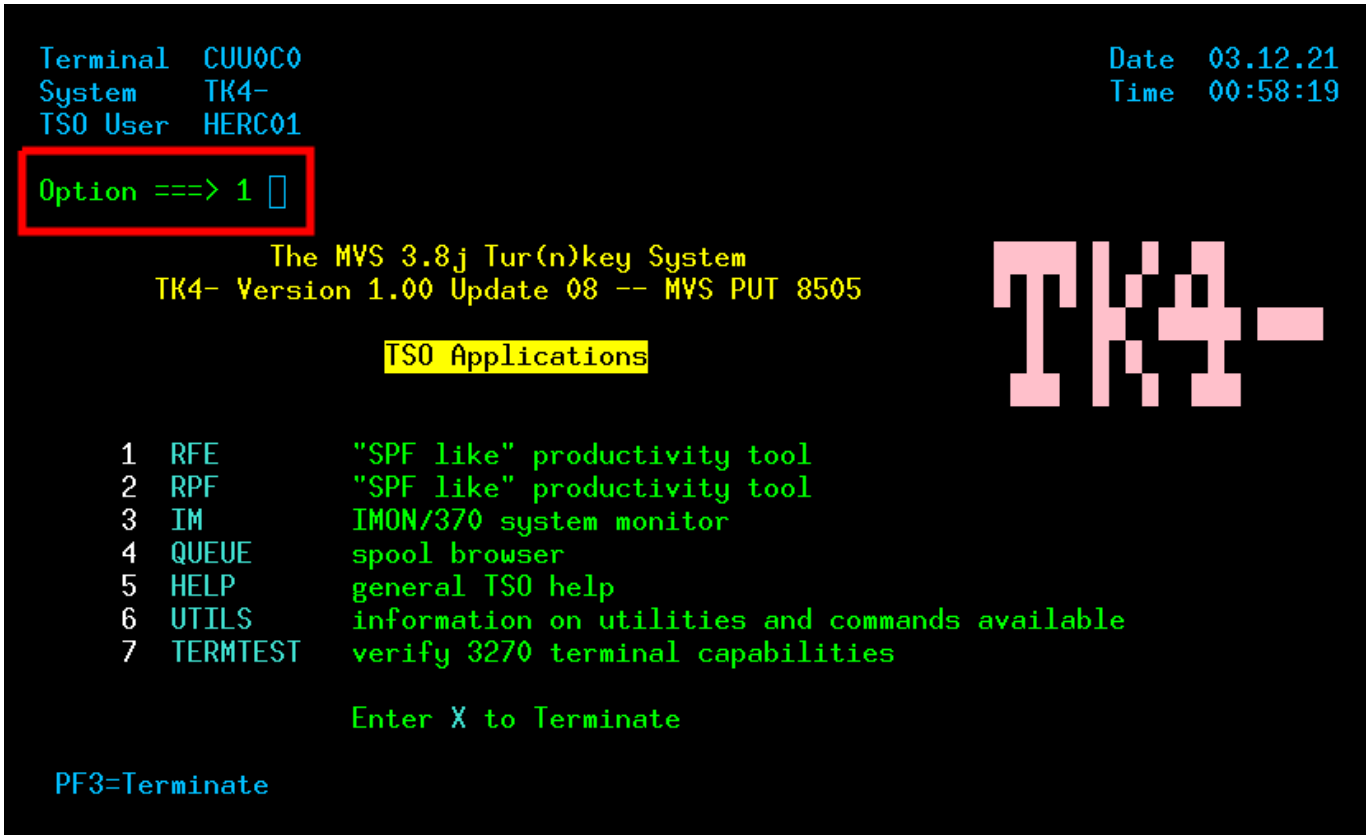
```
JOB NEWCOB(JOB00006) SUBMITTED
***
```

Check the Results

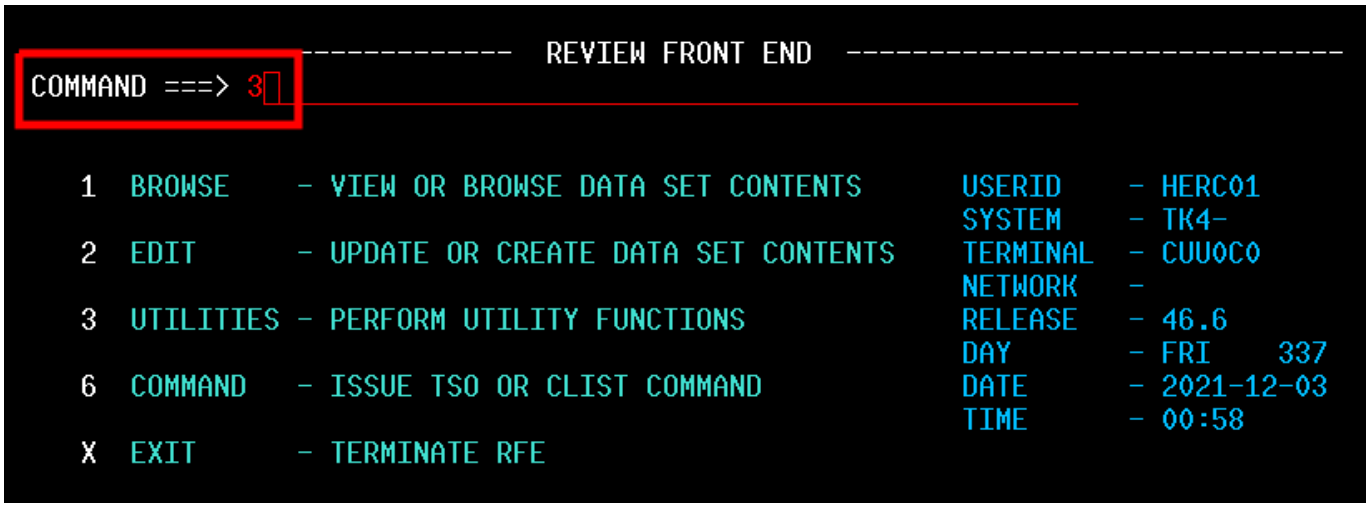
If you aren't already on the main screen, press [F3] until it's displayed:

```
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
```

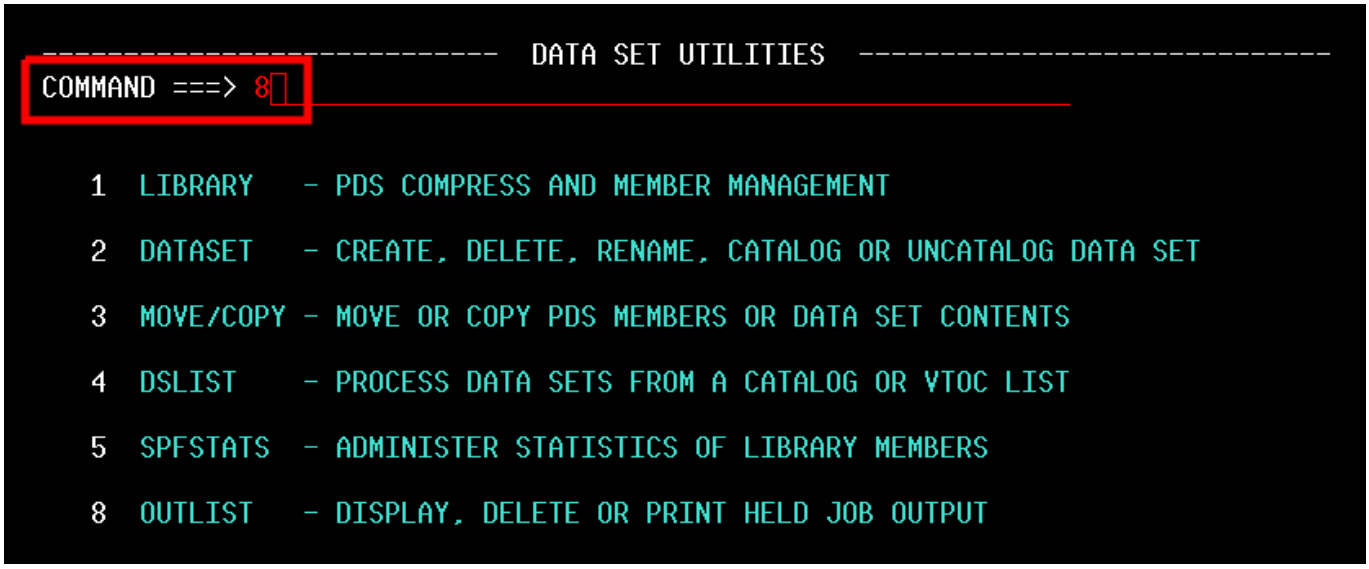
Enter '1' to access the RFE tool:



Enter '3' to access utility functions:

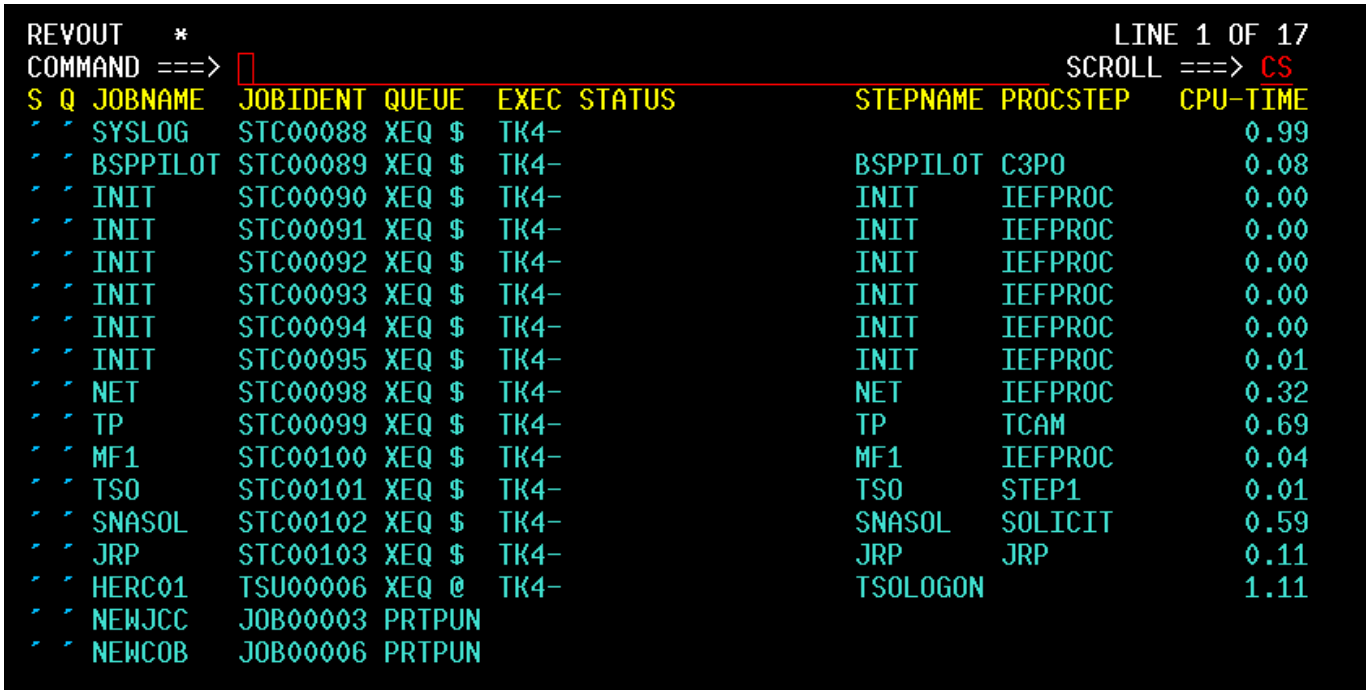


Enter '8' to access held job output:

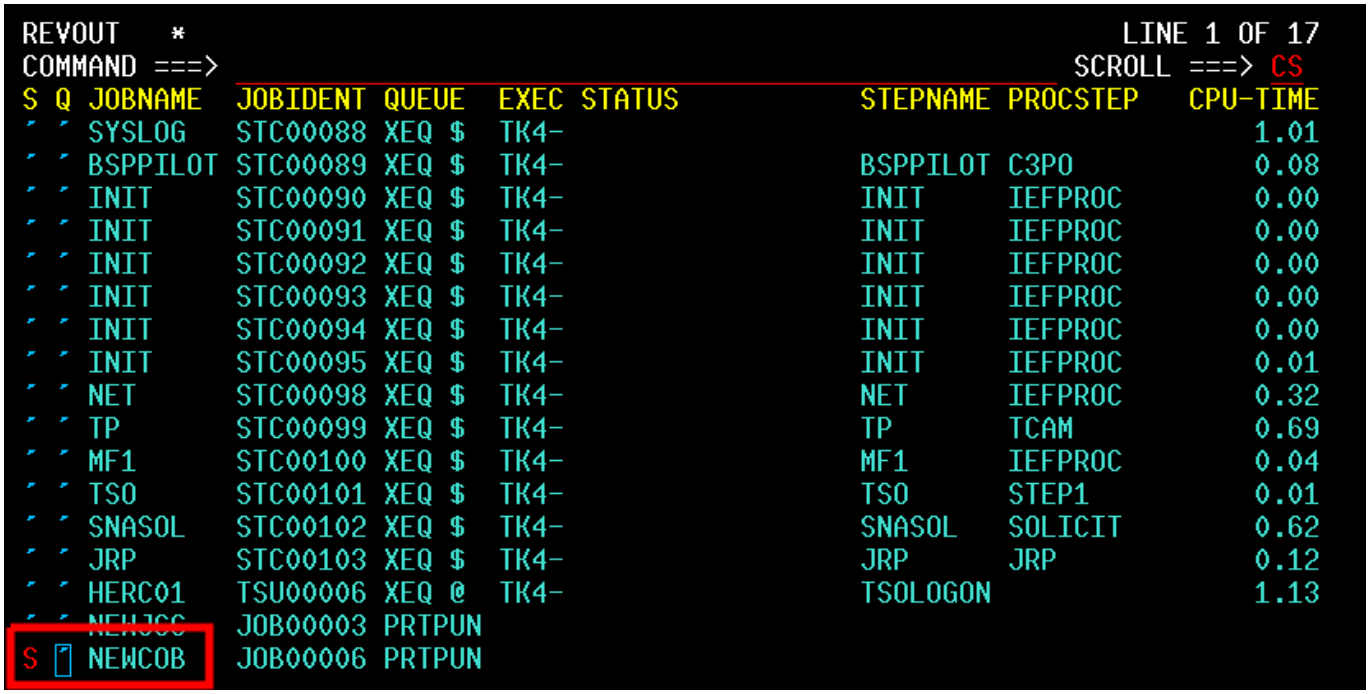


Enter 'ST *', indicating that you want to display all held jobs:

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



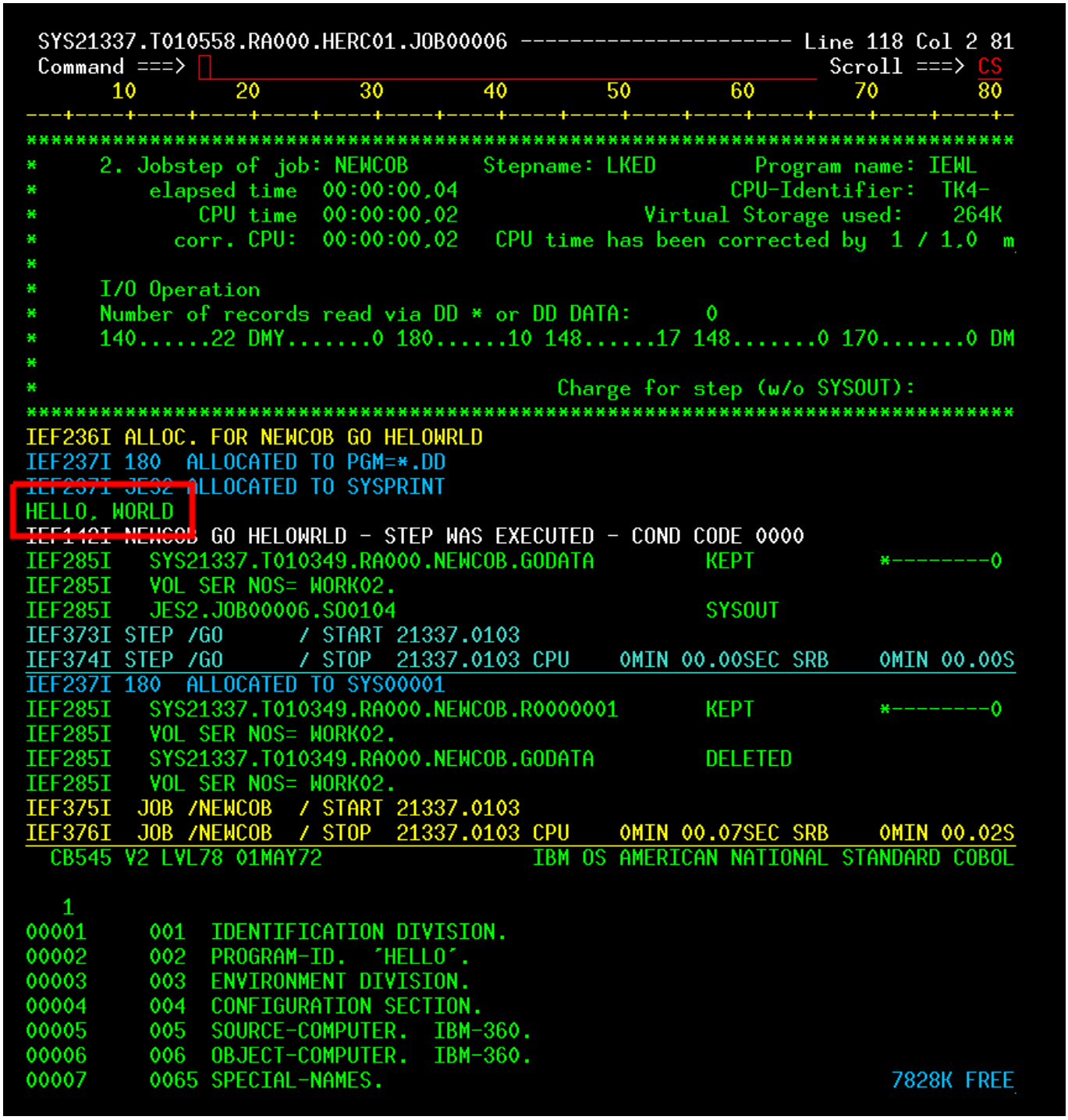
Enter 'S' in the S column for the NEWCOB job:



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:



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:

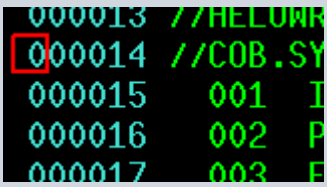
1. Copy 'TESTPL1' instead of 'TESTCOB', and name it 'NEWPL1' instead of 'NEWCOB'.
2. When you edit NEWPL1, change the job name and description to indicate NEWPL1 instead of NEWCOB.

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:



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