



JCL

Chapter a5

Analyzing job output

Job Control Language

Chapter a1. Introduction to JCL

Chapter a2. Coding JOB statements

Chapter a3. Coding EXEC statements

Chapter a4. Coding DD statements

Chapter a5. Analyzing job output

Chapter a6. Conditional processing

Job Control Language

Chapter b1. Using special DD statements

Chapter b2. Introducing procedures

Chapter b3. Modifying EXEC parameters

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Chapter b5. Determining the effective JCL

Chapter b6. Symbolic parameters

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Chapter c1. Nested procedures

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Analyzing job output

Analyzing job output.

Unit introduction.

The information on the JOB statement causes the creation of a printout of each job. This printout is referred to as the SYSOUT listing, or output listing.

The output listing contains separator pages, JCL statement listings, allocation messages, termination messages, and JCL error messages for the job.

This unit discusses each of these elements in detail to enable you to analyze an output listing effectively.

Analyzing job output.

Course objectives.

Be able to:

- **Describe the JCL statement listing that appear in an output listing.**
- **Describe the purpose of the separator page.**
- **Identify allocation messages that may appear in an output listing.**
- **Identify termination messages that may appear in an output listing.**
- **Identify error messages that may appear in an output listing.**

The separator page.

Separator page elements.

What is a separator page?

The separator page isolates the output listings from others printed on the same printer.

What are the elements of a separator page?

The separator page shows:

- The job name.
- The job number assigned by the system.
- The job user's ID.
- SYSOUT class.
- Output group name.

TEST JOB
JOB0729
JOBID: JOB0729
JOBNAME: TESTJOB
USERID: JONES
SYSOUT CLASS: F
OUTPUT GROUP: GRP01.CLASSA.A4219
TITLE: MODULE HASPSSSM Assembly
DESTINATION: WASHDC
NAME: BBJONES
ROOM: 1A-10
BUILDING: BUILDING 3
DEPARTMENT: INFORMATION SYSTEMS
ADDRESS: 100 N, MAIN AVENUE
WASHINGTON, DC
21001
202-231-4001
PRINT TIME: 14:15:23
PRINT DATE: 10 JAN 98
PRINTER NAME: PRT1
SYSTEM: SYSA

The separator page.

Are we on track?

The separator page includes which of the following?

- A. A system-assigned job number.**
- B. Job output, including error messages and comments.**
- C. Information customized by a system administrator.**
- D. Output distribution details.**

JCL statement listing.

JCL statement listing - //

JCL statements coded as part of the job are preceded by slashes (//) in the identifier field.

How do these statements appear in the output listing?

The JCL statements are numbered. When the SYSOUT data set is printed, the operating system numbers the JCL statements automatically.

```
1  //OL29EX00 JOB
    (84,00257), //
    SRA,
    //          MSGLEVEL=(1,1),
    //          MSGCLASS=A,
    //          USER=M925003
2  //COMP      EXEC COBUCLG
.
.
.
23 //SYSUDUMP DD SYSOUT=A
```



JCL statement listing.

JCL statement listing - XX

How are JCL statements coded as part of invoked procedures?

JCL statements can also be statements from any invoked procedure. The XX in the identifier field precedes invoked procedure statements.

Statements from the invoked procedures may also appear in the output listing. The first MSGLEVEL subparameter determines if these statements appear in the output listing.

```
4 XXCOB      EXEC PGM=IKFCBL00
5 XXSTEPLIB  DD DSN=VDCOB.LINKLIB,
  XX          DISP=SHR
6 XXSYSPRINT DD SYSOUT=
7 XXSYSUTI   DD UNIT=SYSDA,
  XX          SPACE=(CYL,(1,1))
```

JCL statement listing.

Are we on track?

In a JCL statement list, what does the XX notation that appears in the identifier field indicate?

- A. Conditional parameter.**
- B. Error message.**
- C. Abnormal termination.**
- D. Invoked procedure.**

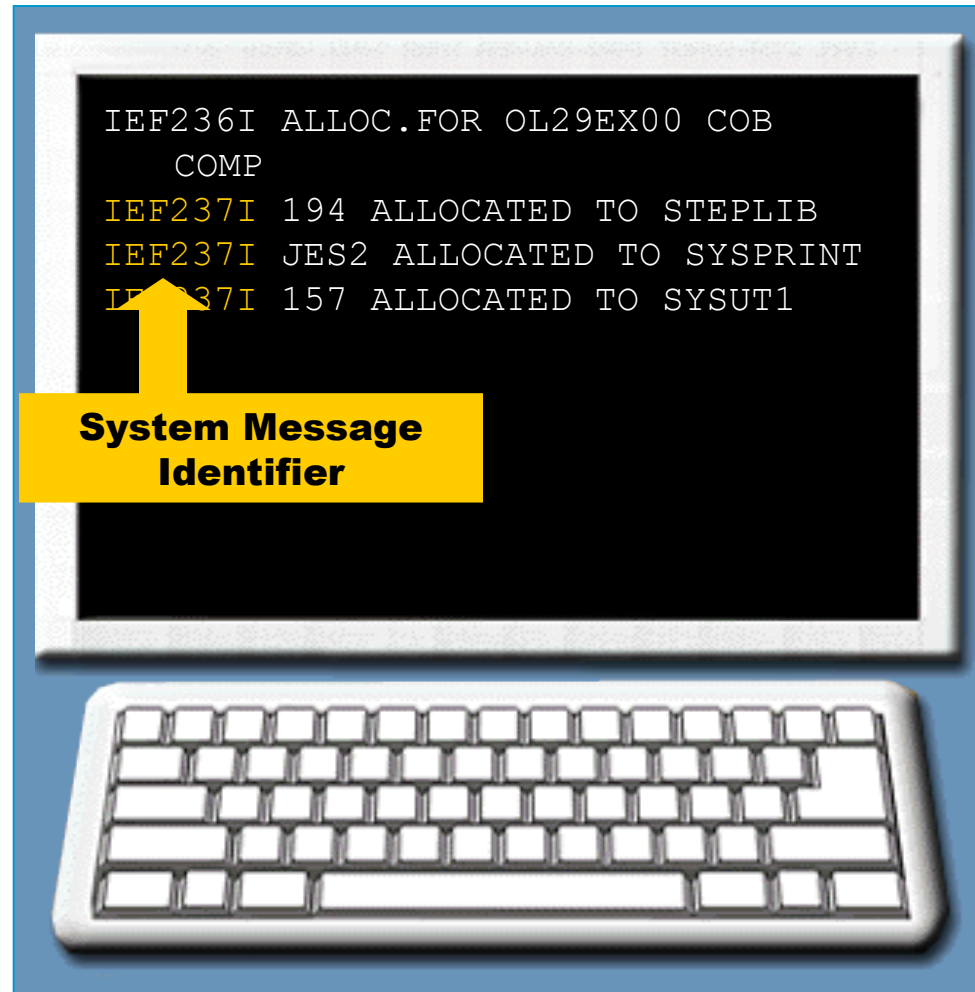
Allocation/Termination.

Allocation messages.

What are Allocation Messages?

Allocation messages show how the system assigns resources to a job.

For example, the allocation messages for a job that allocates three resources (denoted by 194, JES2, and 157) are shown. Notice that each allocation statement follows the system message identifier IEF237I.



Allocation/Termination.

Termination messages.

What are Termination Messages?

Termination messages show job termination and job step termination, as well as the disposition (or status) of the job's data sets at the time of termination.

How do these messages appear in the output listing?

Like allocation messages, termination messages are characterized by specially numbered statements.

```
IEF142I OL29EX00 COB COMP - STEP WAS  
EXECUTED - COND CODE 0012  
IEF285I VSCOB.LINKLIB KEPT  
IEF285I VOLSER NOS=SRARSA.  
IEF285I JES2.JOB02439.S00102 SYSOUT  
IEF285I SYS86357.T103552.RA000.OL29EX00.  
R0000001 DELETED  
IEF285I VOLSER NOS=STGA57.
```



Allocation/Termination.

Termination messages – an example.

In this example, the termination messages indicate the COMP step of the COB job terminated with a condition code of 12.

At the time of termination, the system kept the VSCOB.LINKLIB data set, sent the JES2 control messages to the SYSOUT data set, and deleted the SYS86357.T103552.RA000.OL29EX00.R000001 system data set.

```
IEF142I OL29EX00 COB COMP - STEP WAS  
EXECUTED - COND CODE 0012  
IEF285I VSCOB.LINKLIB KEPT  
IEF285I VOLSER NOS=SRARSA.  
IEF285I JES2.JOB02439.S00102 SYSOUT  
IEF285I SYS86357.T103552.RA000.OL29EX00.  
R000001 DELETED  
IEF285I VOLSER NOS=STGA57.
```



Allocation/Termination.

Are we on track?

Based on the termination messages, what happened during the job?

```
IEF142I OL29EX00 PAY STEP2 - STEP WAS EXECUTED - COND CODE 008
IEF285I CHECK.LINKLIB KEPT
IEF285I VOL SER NOS= SRASA.
IEF285I JES2.JOB02439.SO0102 SYSOUT
IEF285I SYS1741 DELETED
IEF285I VOL SER NOS= STGA57
```

- A. STEP2 of the PAY job terminated with the condition code of 8.**
- B. The CHECK.LINKLIB data set was deleted.**
- C. The program was terminated abnormally.**
- D. The SYS1741 data set was deleted.**

JCL error messages.

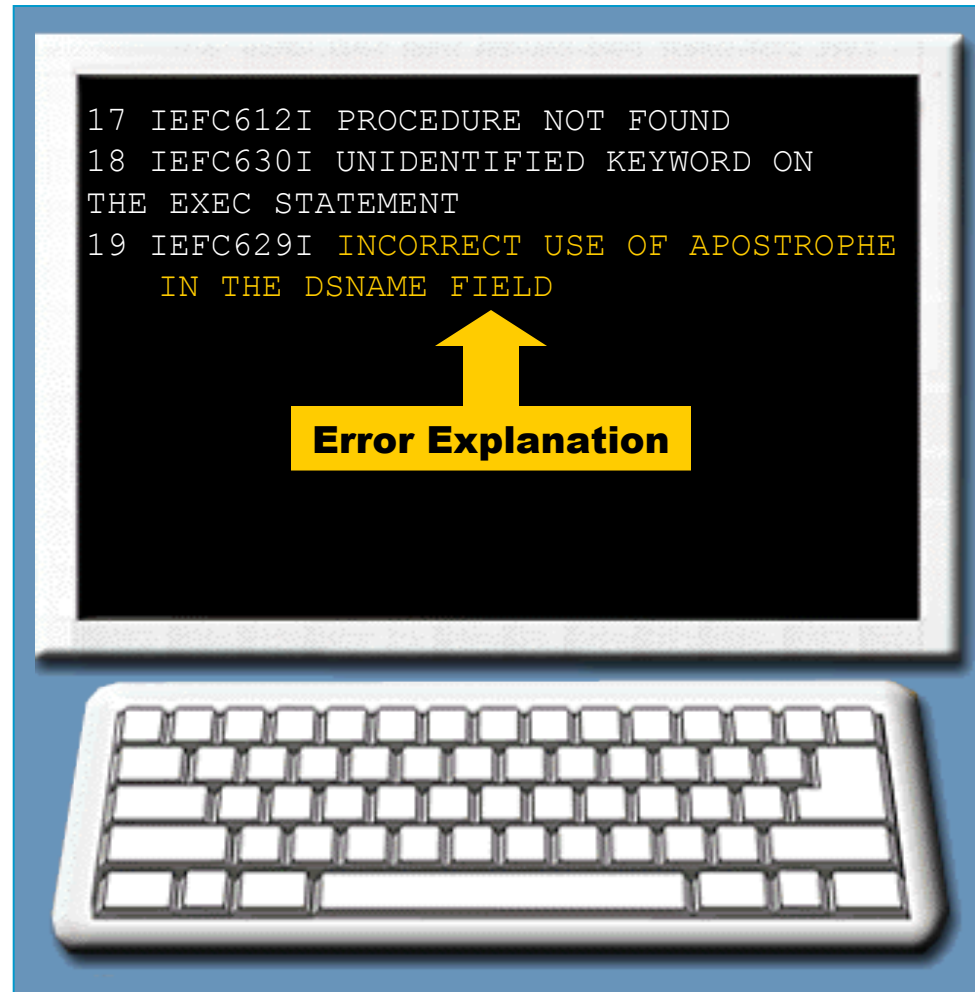
JCL error messages.

What are JCL Error Messages?

JCL error messages point to any JCL statements that contain coding errors or fail to execute properly.

Usually JCL error messages contain the JCL statement number of the statement that caused the error to occur.

Just like allocation and termination messages, system message identifiers precede JCL error messages.



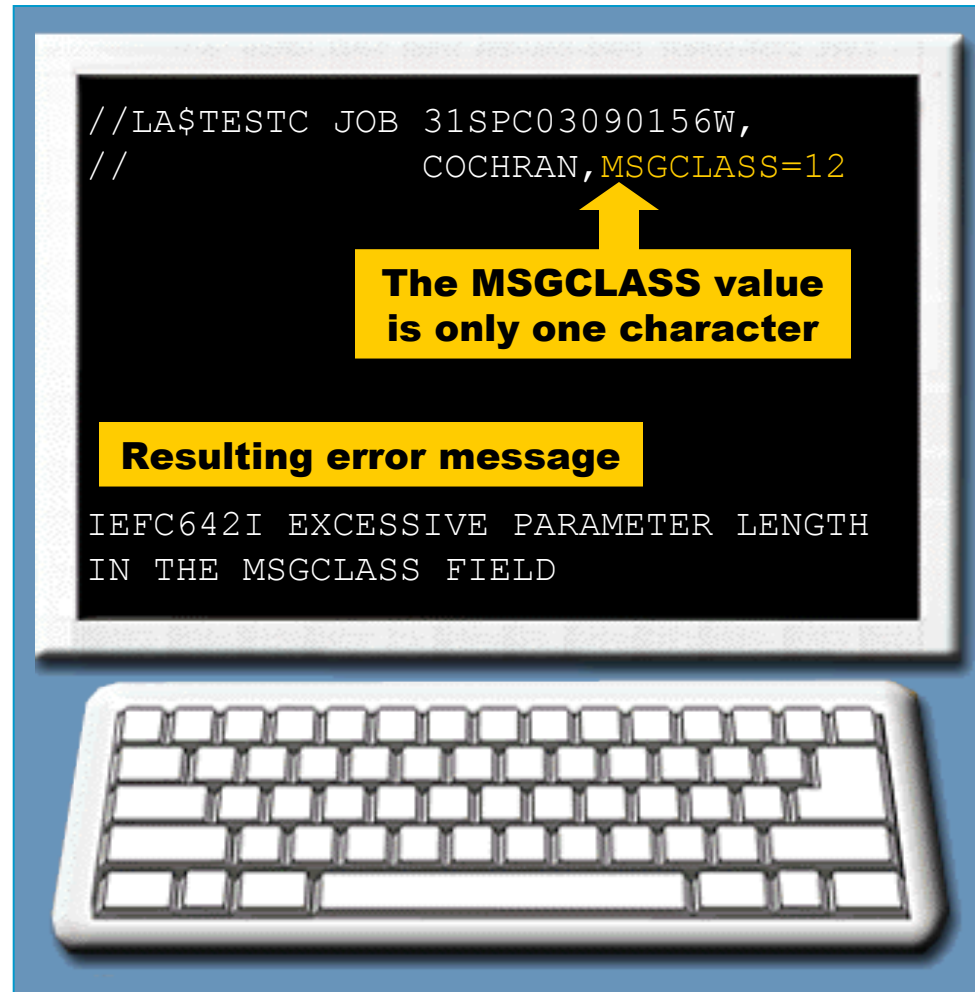
JCL error messages.

JCL error messages – example 1.

In this example, the value of the message class is too long (MSGCLASS=12).

The value of the MSGCLASS parameter is only one character (e.g., MSGCLASS=A).

The JCL error message shown would occur if this JOB statement was run.



JCL error messages.

JCL error messages – example 2.

Often typos in the JCL are the causes of JCL error messages.

Here the MSGLEVEL parameter in the JOB statement is misspelled.

The JCL error message would occur if the JOB statement was run.



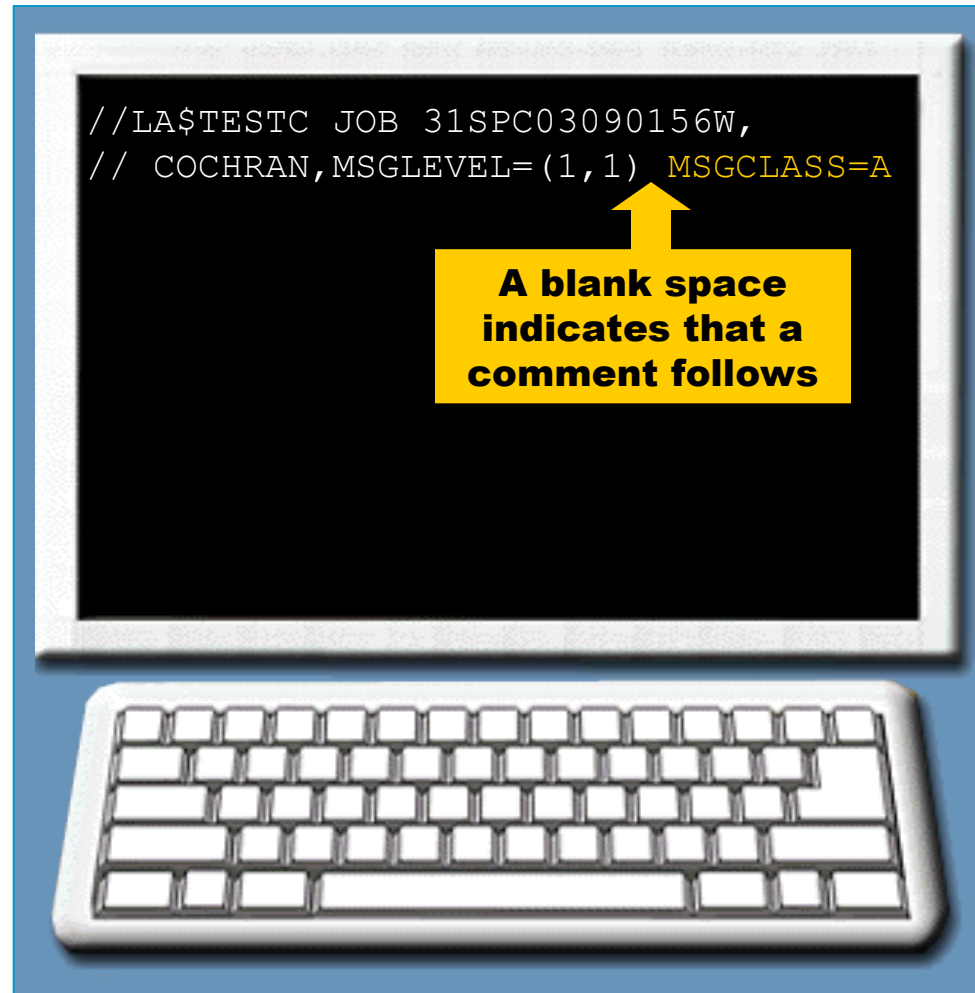
JCL error messages.

JCL error messages – example 3.

In some cases, there might be errors in the JCL, even if no error messages appear in the output listing.

Here in this example, a space exists between the MSGLEVEL and MSGCLASS parameters.

The operating system considers anything after the space as comment and so will ignore the request for message class. And as MSGCLASS=A is considered a comment, no error message will be listed.



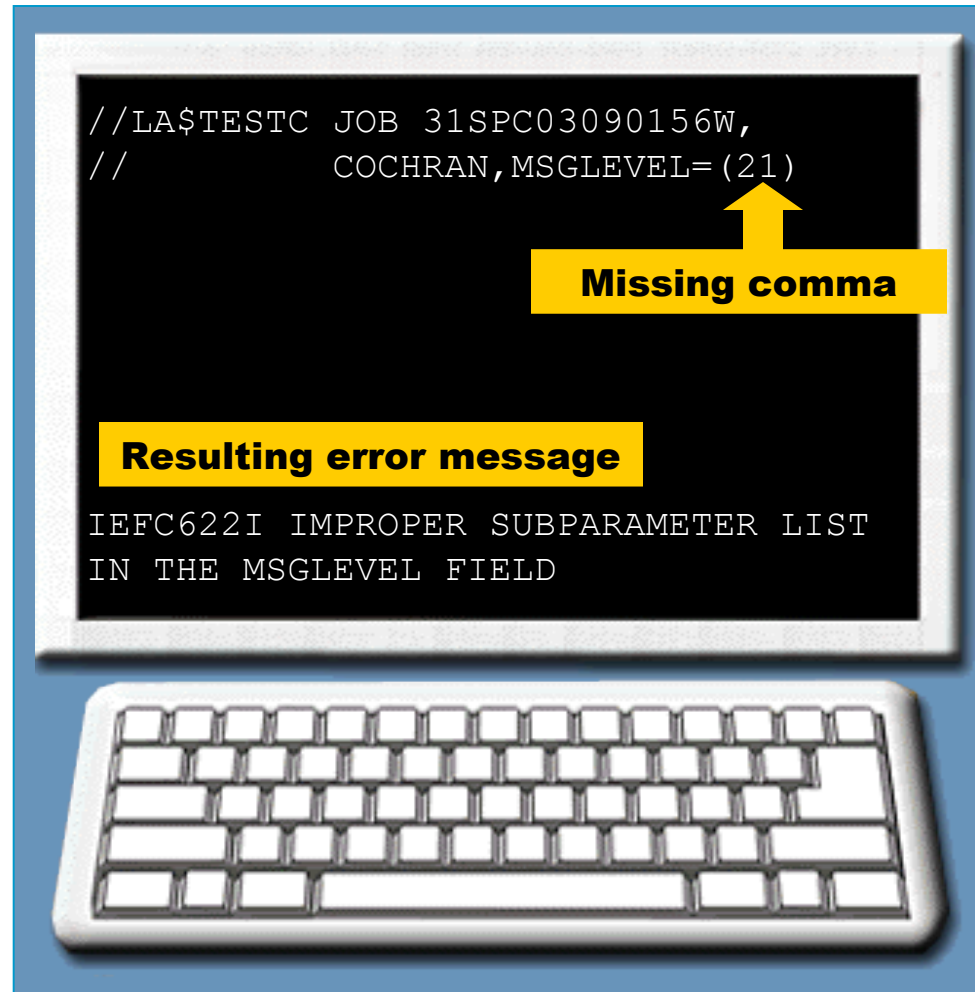
JCL error messages.

JCL error messages – example 4.

Another common error when coding JCL statements is to omit or transpose comma and periods.

In the example, the comma between the 2 and 1 in the MSGLEVEL parameter was accidentally omitted.

Running a job with this JOB statement would cause an JCL error message as shown.



JCL error messages.

Are we on track?

Which of the following error messages would appear if you tried to run the following JOB statement?

```
//TESTJOB JOB IA4RE,TEMPEST,MSGLEVEL=(1.1)
```

- A. IEFC6421 EXCESSIVE PARAMETER LENGTH IN MSGLEVEL FIELD
- B. No error message would appear.
- C. IEFC6301 UNIDENTIFIED KEYWORD MSGLVL
- D. IEFC6221 IMPROPER SUBPARAMETER LIST IN THE MSGLEVEL FIELD

Analyzing job output.

Unit summary.

Now that you have completed this unit, you should be able to:

- **Explain the kinds of information included in an output listing; that is, a separator page, JCL statement listing, allocation and termination messages, and error messages.**
- **Describe the purpose of the separator page.**
- **Describe the JCL statement listing that appear in a output listing.**
- **Identify allocation messages that may appear in an output listing.**
- **Identify termination messages that may appear in an output listing.**
- **Identify error messages that may appear in an output listing.**

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Unit introduction.

The information on the **JOB** statement causes the creation of a printout of each job. This printout is referred to as the **SYSOUT** listing, or output listing.

The output listing contains separator pages, JCL statement listings, allocation messages, termination messages, and JCL error messages for the job.

This unit discusses each of these elements in detail to enable you to analyze an output listing effectively.

SYSOUT Parameter

Parameter Type

Keyword, optional

Purpose

Use the SYSOUT parameter to identify this data set as a system output data set, usually called a sysout data set.

Analyzing job output.

Course objectives.

Be able to:

- Describe the JCL statement listing that appear in an output listing.
- Describe the purpose of the separator page.
- Identify allocation messages that may appear in an output listing.
- Identify termination messages that may appear in an output listing.
- Identify error messages that may appear in an output listing.

The separator page.

Separator page elements.

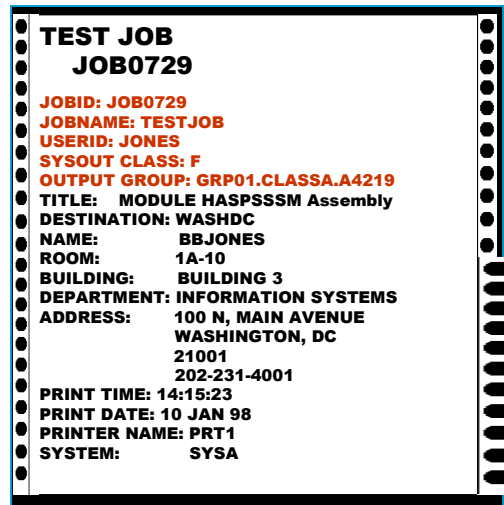
What is a separator page?

The separator page isolates the output listings from others printed on the same printer.

What are the elements of a separator page?

The separator page shows:

- The job name.
- The job number assigned by the system.
- The job user's ID.
- SYSOUT class.
- Output group name.



...and many others as you can see on the example.

The system administrator may have created a customized separator page for the installation that includes additional information.

We do not use any separator page because we do not use any directly mainframe connected printer.

The separator page.

Are we on track?

The separator page includes which of the following?

- A. A system-assigned job number.**
- B. Job output, including error messages and comments.**
- C. Information customized by a system administrator.**
- D. Output distribution details.**

The correct answers are A., C., and D.
Look at the previous page example.

JCL statement listing.

JCL statement listing - //

JCL statements coded as part of the job are preceded by slashes (//) in the identifier field.

How do these statements appear in the output listing?

The JCL statements are numbered. When the SYSOUT data set is printed, the operating system numbers the JCL statements automatically.



Job Control Statements on the Output Listing

Use the JOB statement MSGLEVEL parameter to request that job control statements be printed in the job log output listing. Code MSGLEVEL=(1,1) to receive the maximum amount of information, in the following order:

- JES messages and job statistics.
- All job control statements in the input stream and procedures.
- Messages about job control statements.
- JES and operator messages about the job's processing: allocation of devices and volumes, execution and termination of job steps and the job, and disposition of data sets.

Statements in Listing

To identify the source and type of each statement, the system prints certain characters in columns 1 and 2 or 1, 2, and 3 of the listing. The listing shows all procedure statements as they appear in the cataloged procedure; the listing does not show parameter substitutions and overrides on the statement itself.

Symbolic Parameters

The job log listing shows the symbolic parameters in procedure statements. The values assigned to the parameters are given in IEFC653I messages. These messages appear immediately after each statement that contains symbolic parameters.

JCL statement listing.

JCL statement listing - XX

How are JCL statements coded as part of invoked procedures?

JCL statements can also be statements from any invoked procedure. The XX in the identifier field precedes invoked procedure statements.

Statements from the invoked procedures may also appear in the output listing. The first MSGLEVEL subparameter determines if these statements appear in the output listing.



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Identification of Statements in Job Log

Job Control Statements in the Input Stream

// JCL statement.
//* JCL comment statement.

Cataloged Procedure Statements

XX DD statement that was not overridden and all other JCL statements, except the JCL comment statement. Each statement appears in the listing exactly as it appears in the procedure.
X/ DD statement that was overridden (preceded by the overriding DD statement).
XX* JCL comment statement

In-Stream Procedure Statements

++ DD statement that was not overridden and all other JCL statements, except the JCL comment statement. Each statement appears in the listing exactly as it appears in the procedure.
+/ DD statement that was overridden (preceded by the overriding DD statement).
++* JCL comment statement.

JCL statement listing.

Are we on track?

In a JCL statement list, what does the XX notation that appears in the identifier field indicate?

- A. Conditional parameter.**
- B. Error message.**
- C. Abnormal termination.**
- D. Invoked procedure.**

The correct answer is D.

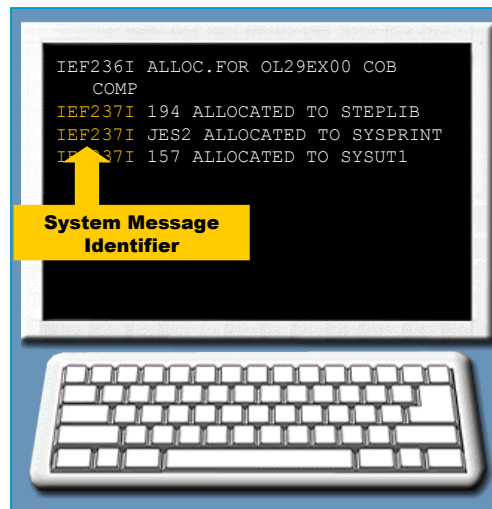
Allocation/Termination.

Allocation messages.

What are Allocation Messages?

Allocation messages show how the system assigns resources to a job.

For example, the allocation messages for a job that allocates three resources (denoted by 194, JES2, and 157) are shown. Notice that each allocation statement follows the system message identifier IEF237I.



See Messages books for detail explanations.

Try QuickRef mainframe application: **qw**.

Try IBM LookAt Web application:

<http://www-03.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/>

Allocation/Termination.

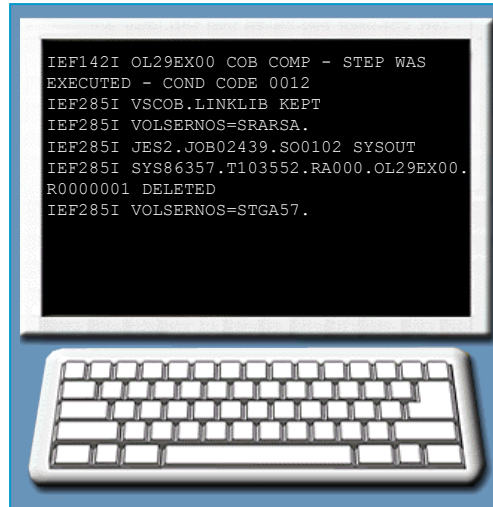
Termination messages.

What are Termination Messages?

Termination messages show job termination and job step termination, as well as the disposition (or status) of the job's data sets at the time of termination.

How do these messages appear in the output listing?

Like allocation messages, termination messages are characterized by specially numbered statements.



Detailed explanations of the allocation and termination messages can be found in IBM's System Messages manual. You can find the message explanation by referencing the system message identifier in the manual.

Allocation/Termination.

Termination messages – an example.

In this example, the termination messages indicate the COMP step of the COB job terminated with a condition code of 12.

At the time of termination, the system kept the VSCOB.LINKLIB data set, sent the JES2 control messages to the SYSOUT data set, and deleted the SYS86357.T103552.RA000.OL29EX00.R000001 system data set.



Each termination statement follows a system message identifier, either IEF142I or IEF285I.

Allocation/Termination.

Are we on track?

Based on the termination messages, what happened during the job?

```
IEF142I OL29EX00 PAY STEP2 - STEP WAS EXECUTED - COND CODE 008
IEF285I CHECK.LINKLIB KEPT
IEF285I VOL SER NOS= SRASA.
IEF285I JES2.JOB02439.S00102 SYSOUT
IEF285I SYS1741 DELETED
IEF285I VOL SER NOS= STGA57
```

- A. STEP2 of the PAY job terminated with the condition code of 8.**
- B. The CHECK.LINKLIB data set was deleted.**
- C. The program was terminated abnormally.**
- D. The SYS1741 data set was deleted.**

The correct answer is A. and D.

JCL error messages.

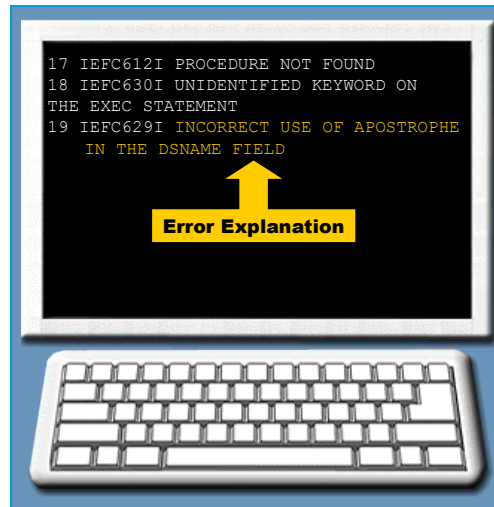
JCL error messages.

What are JCL Error Messages?

JCL error messages point to any JCL statements that contain coding errors or fail to execute properly.

Usually JCL error messages contain the JCL statement number of the statement that caused the error to occur.

Just like allocation and termination messages, system message identifiers precede JCL error messages.



The statement number of the statement that caused the error precedes the system message identifiers.

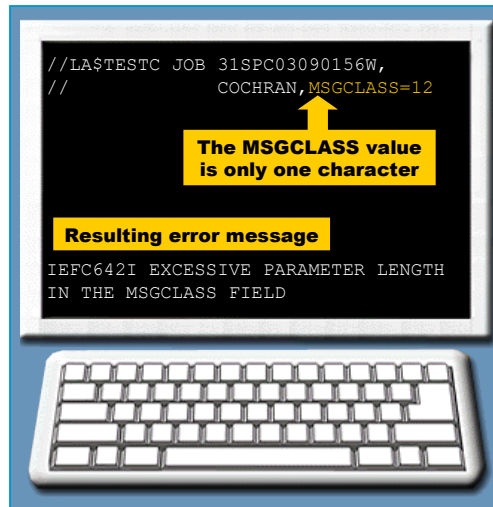
JCL error messages.

JCL error messages – example 1.

In this example, the value of the message class is too long (MSGCLASS=12).

The value of the MSGCLASS parameter is only one character (e.g., MSGCLASS=A).

The JCL error message shown would occur if this JOB statement was run.



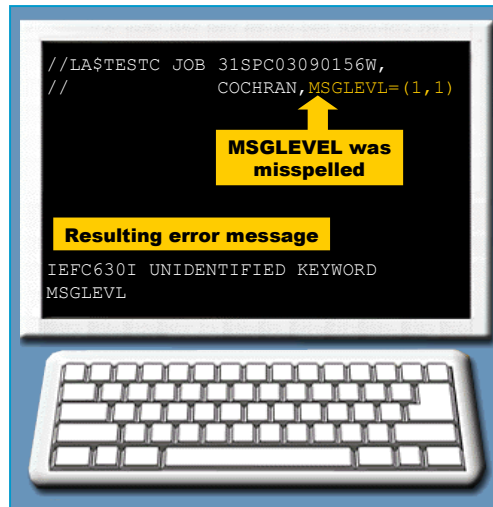
JCL error messages.

JCL error messages – example 2.

Often typos in the JCL are the causes of JCL error messages.

Here the MSGLEVEL parameter in the JOB statement is misspelled.

The JCL error message would occur if the JOB statement was run.



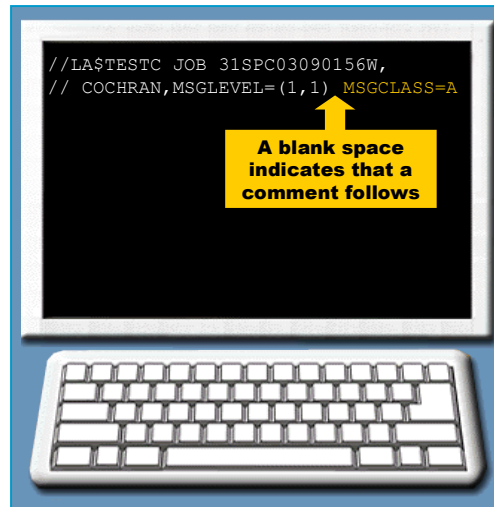
JCL error messages.

JCL error messages – example 3.

In some cases, there might be errors in the JCL, even if no error messages appear in the output listing.

Here in this example, a space exists between the MSGLEVEL and MSGCLASS parameters.

The operating system considers anything after the space as comment and so will ignore the request for message class. And as MSGCLASS=A is considered a comment, no error message will be listed.



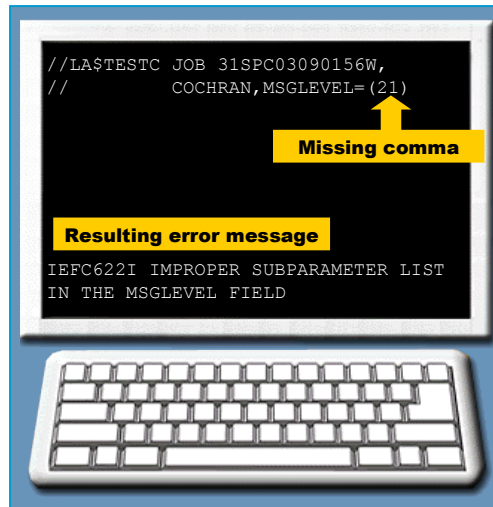
JCL error messages.

JCL error messages – example 4.

Another common error when coding JCL statements is to omit or transpose comma and periods.

In the example, the comma between the 2 and 1 in the MSGLEVEL parameter was accidentally omitted.

Running a job with this JOB statement would cause an JCL error message as shown.



JCL error messages.

Are we on track?

Which of the following error messages would appear if you tried to run the following JOB statement?

//TESTJOB JOB IA4RE,TEMPEST,MSGLEVEL=(1.1)

- A. IEFC6421 EXCESSIVE PARAMETER LENGTH IN MSGLEVEL FIELD**
- B. No error message would appear.**
- C. IEFC6301 UNIDENTIFIED KEYWORD MSGLVL**
- D. IEFC6221 IMPROPER SUBPARAMETER LIST IN THE MSGLEVEL FIELD**

The correct answer is D.

Analyzing job output.

Unit summary.

Now that you have completed this unit, you should be able to:

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