JCL

Chapter a4
Coding DD statements

Job Control Language

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Chapter a2. Coding JOB statements

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Chapter a5. Analyzing job output

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Chapter c1. Nested procedures

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Chapter a4

Coding DD statements

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Course objectives.

Be able to:

- Identify how to connect a DD statement to the program requirement for input/output.

- Identify the number of DD statements required for a given program.

- Understand the advantages of identifying the application data set and its location at program initiation time.

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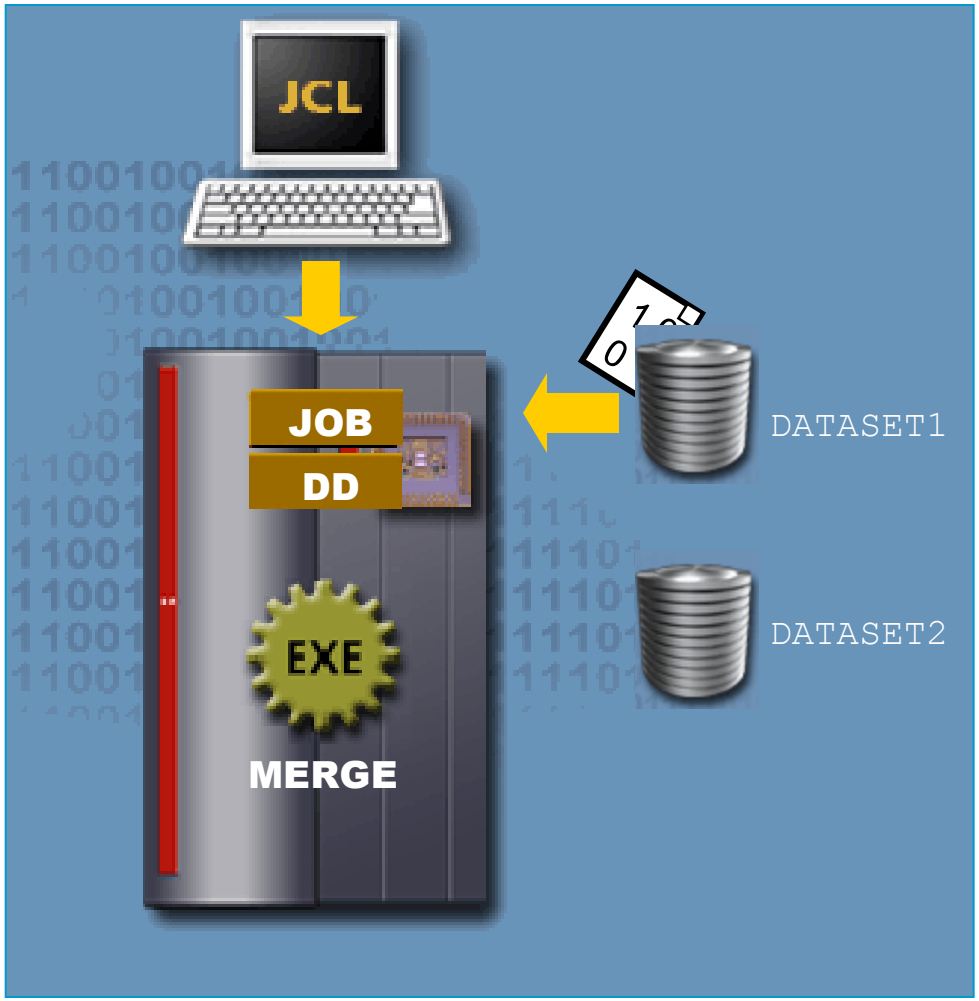
Defining a DD statement.

What is a DD statement?

Each data set used or created in a job step requires a separate DD statement.

In the example three data sets are involved, so three separate DD statements are required in the JCL, one for each data set.

A program called MERGE reads a particular data set (DATASET1).



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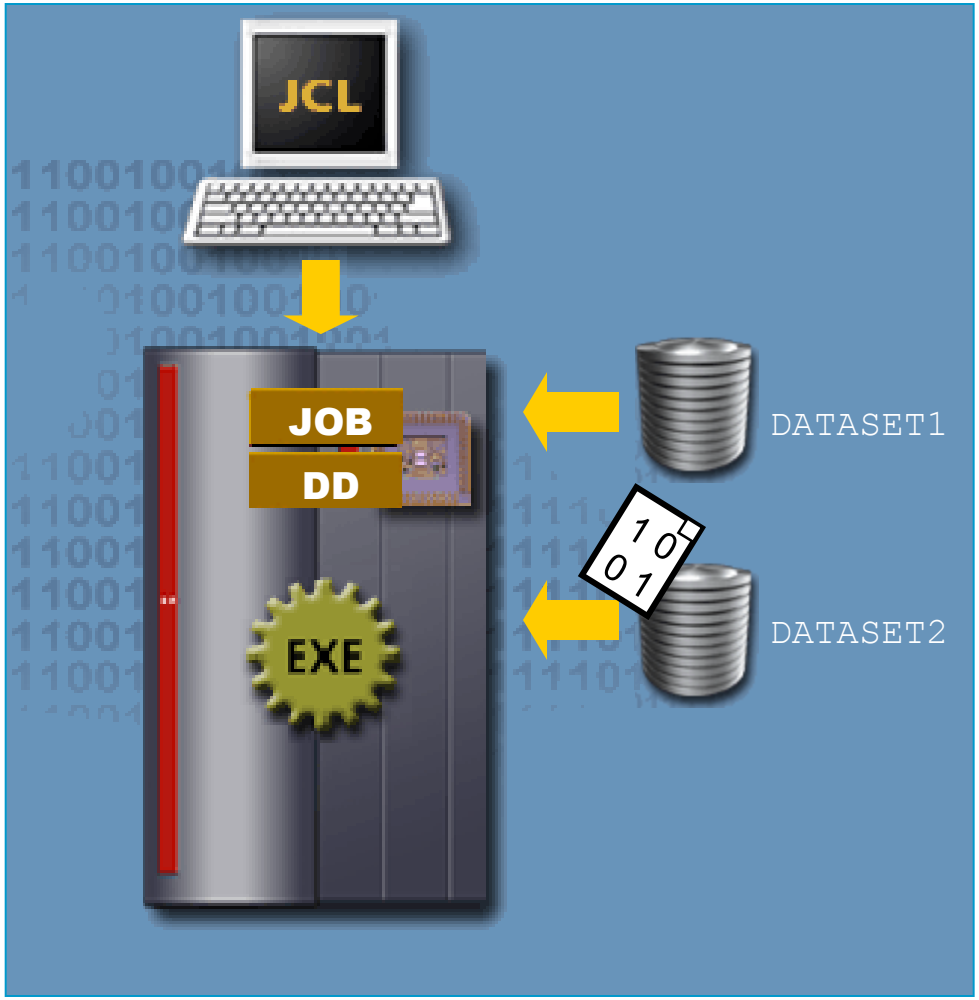
Defining a DD statement.

During the course of the execution, this data set receives updates from the second data set (DATASET2).



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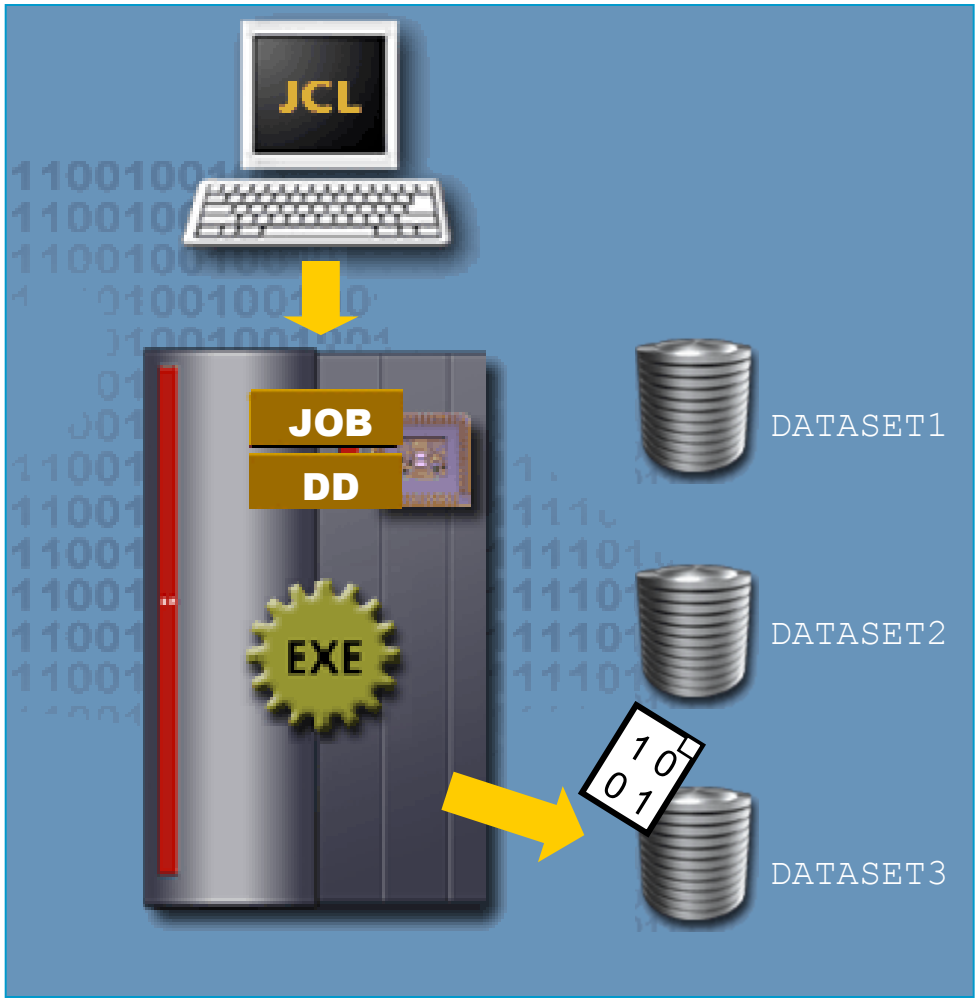
Defining a DD statement.

The result of this update creates a new data set (DATASET3).



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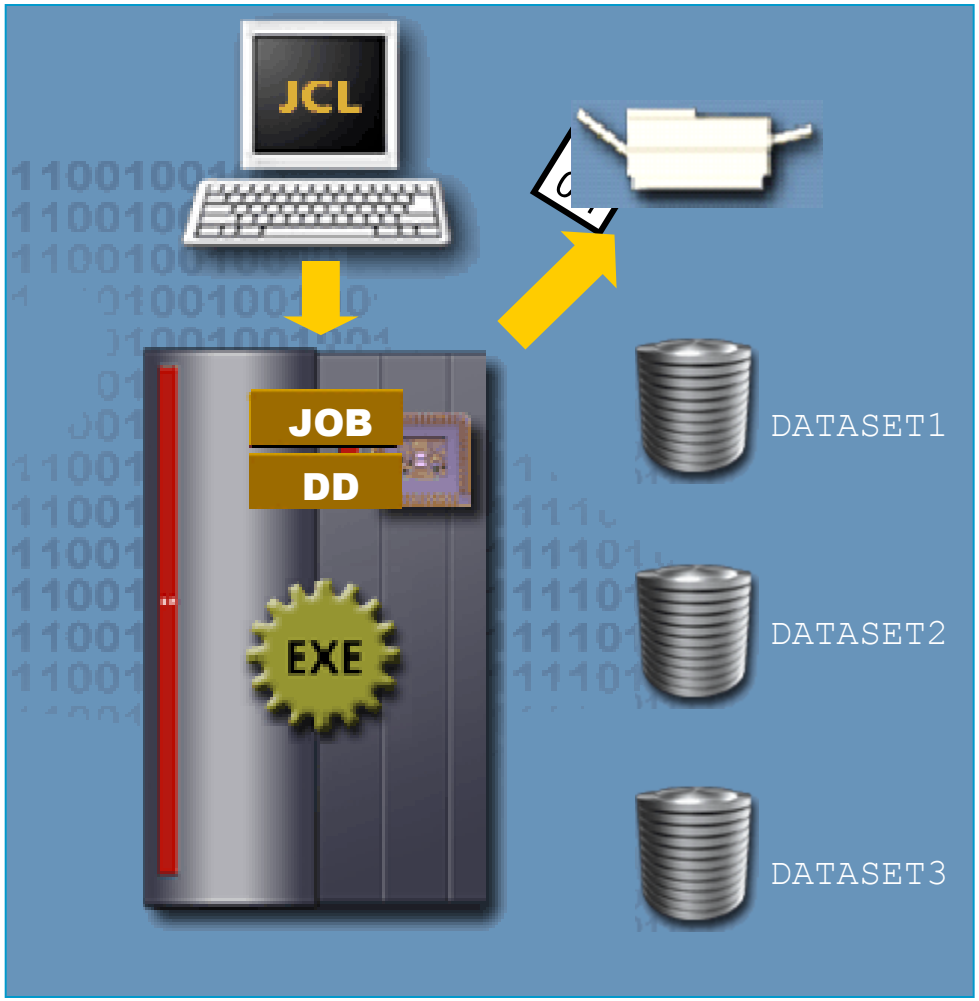
DD statements – SYSOUT.

If the program also prints an output listing a fourth DD statement must be coded into the accompanying JCL.

This one is for the SYSOUT data set that is spooled and eventually printed.



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Coding a DD statement.

Are we on track?

The system accesses a member of a private library in order to run a program, then sends the output to a printer. How many DD statements would the JCL for the job contain?

A. Three

B. None

C. One

D. Two

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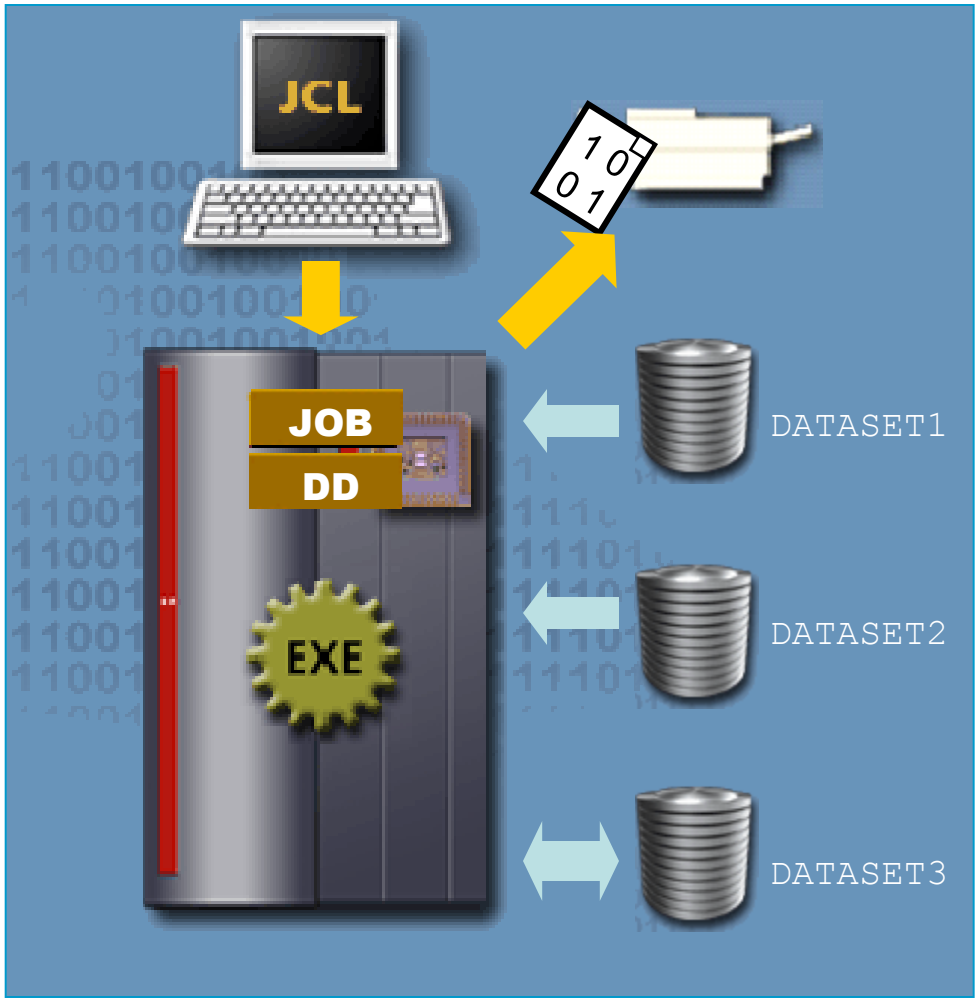
The DD statement syntax.

The syntax used for coding a DD statement is:

```
//ddname DD parameter(s)
```

The DD statement identifies the basic information about a data set including:

- DDname used by the program to reference a data set.
- The data set name.
- The location of the data set.
- The manner in which data set should be accessed.



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Coding a DD statement.

Are we on track?

Code a DD statement using the following information:

The DDname is DD1 and parameter is DSN=WEEKLY

```
//JOB1      JOB   255,SMITH
//STEP1     EXEC  PGM=PAYROLL
//DD1        DD
```

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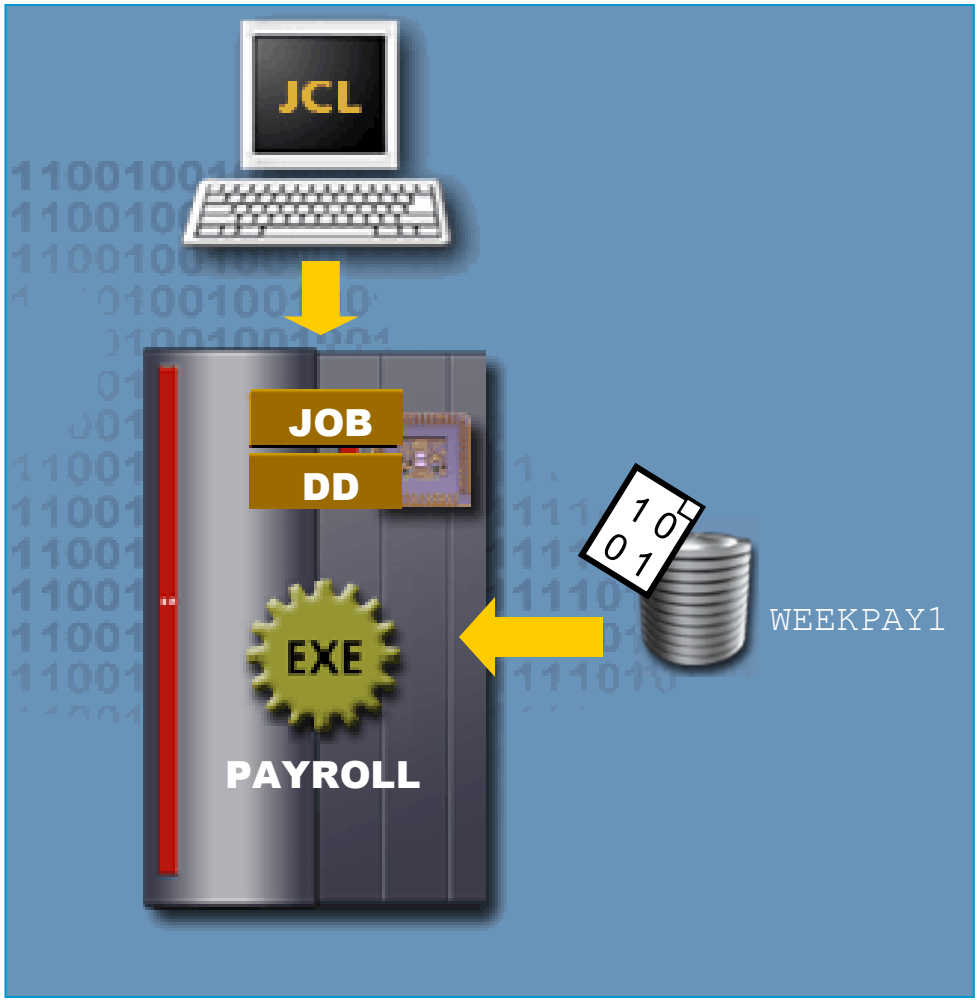
DD statement – an example.

The PAYROLL program might specify a DDname of PAY for the weekly payroll data set. The program uses DDname PAY to point to the data set for input to the payroll program.

If the payroll data set for that week is WEEKPAY1, then the JCL might appear as:

```
//MYJOB     JOB
//STEP1     EXEC   PGM=PAYROLL
//PAY       DD     DSN=WEEKPAY1
```



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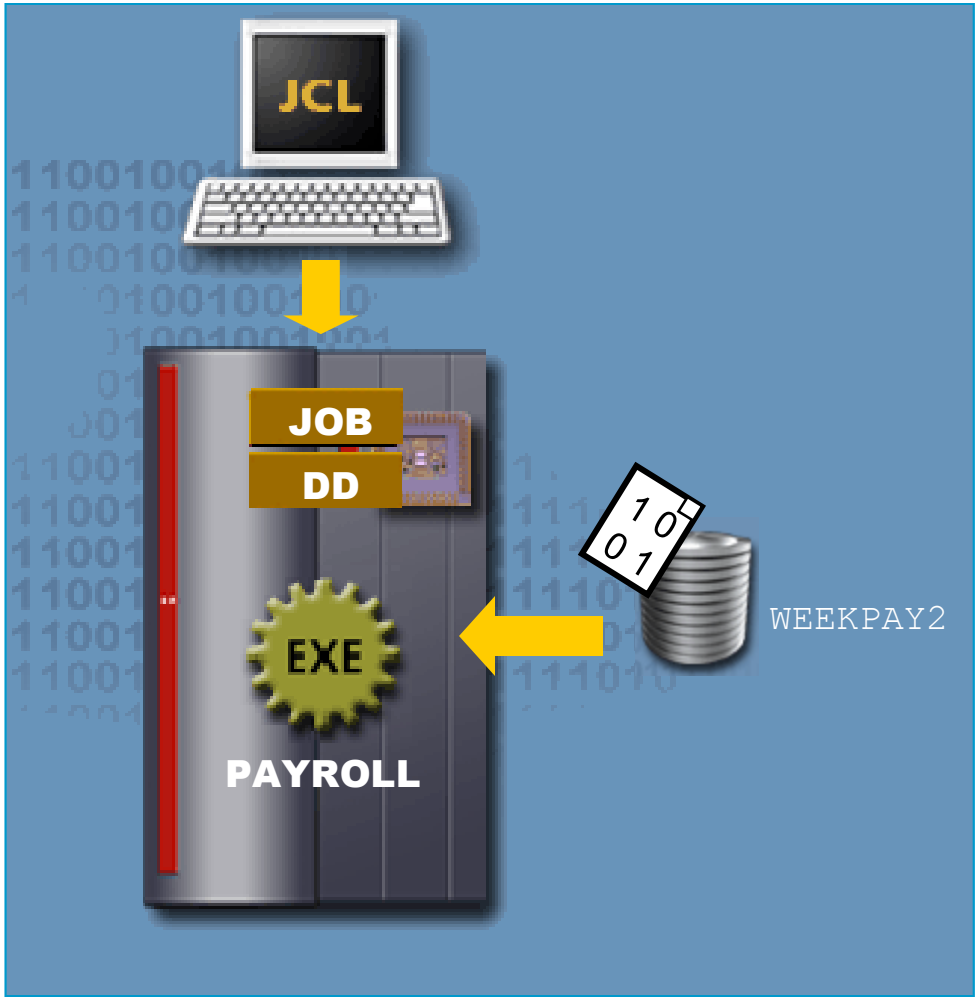
DD statement – an example.

The following week, the payroll data set is WEEKPAY2. The program can use the same DDNAME (PAY), the JCL has to refer to the WEEKPAY2 data set like this:

```
//MYJOB     JOB
//STEP1     EXEC   PGM=PAYROLL
//PAY       DD     DSN=WEEKPAY2
```



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Advantage of using DD statements in the JCL.

The advantages of using DD statements in JCL are:

- **It allows the data set information to change without recompiling the programs that access the data set.**
- **It increases reusability of programs.**
- **The installation becomes more adaptable.**

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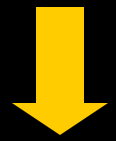
DD statement parameters.

The characteristics of DD statement parameters are:

- Adding parameters in the DD statement allows us to specify the characteristics of a data set.

- DD statement parameters can be coded in any order as they are keyword parameters.

```
//DDNAME DD parameter(s)
```



```
DSN
DISP
UNIT
VOL
SPACE
LABEL
DCB
SYSOUT
```

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DD statement parameters – DSN.

What are the characteristics of the DSN parameter?

The characteristics of the DSN parameter are:

- The Data Set Name (DSN) parameter specifies the name of the data set.

- Data sets are either temporary or non-temporary.

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Temporary data sets.

The characteristics of a temporary data set are:

- **Temporary data set is used for storage within the life cycle of the job.**

- **Naming a temporary data set is optional.**

- **Temporary data set names can be coded either by including two ampersands (&&) before the name or by leaving out the DSN parameter.**

- **The syntax used in coding temporary data sets is:**

```
//DATA1    DD DSN=&&FIRST
           or
//DATA1    DD (all needed parameters except DSN parameter)
```

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Non-temporary data sets.

The characteristics of a non-temporary data set are:

- **Non-temporary data sets can be saved and reused after the job has completed.**
- **Non-temporary data sets must be given a data set name.**
- **The syntax used in coding non-temporary data sets is:**

```
//DATA2    DD DSN=SECOND
```

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DD statement parameters – DISP.

The data set disposition (DISP) parameter specifies the current status of a data set and tells the system which method to use for handling the data set after the job step terminates.

- The current status of a data set can be: Old, New, Mod, Shared.

- The method of handling a data set after termination can be: Delete, Keep, Catalog.

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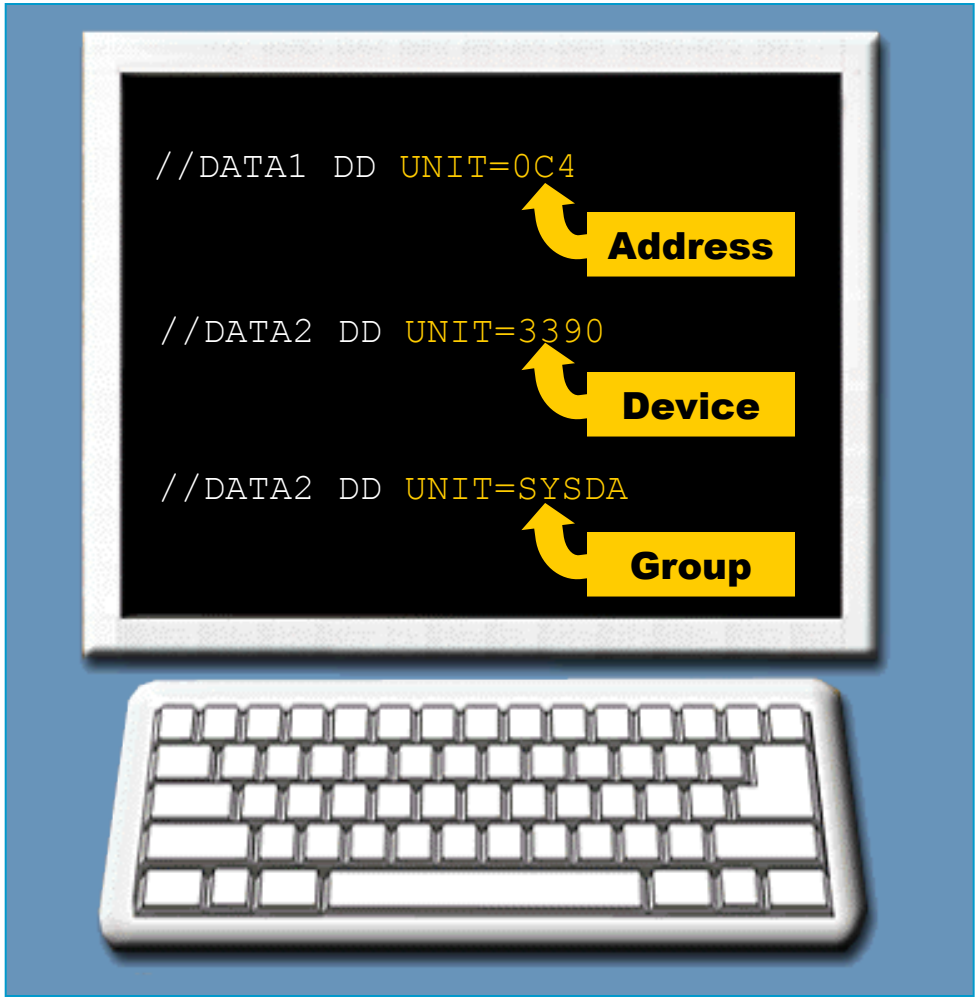
DD statement parameters - UNIT.

What are the characteristics of the UNIT parameter?

The I/O UNIT parameter is used to request the type (or group) of hardware device(s) used to store or access a data set.

Interaction with I/O devices can be accomplished by specifying its:

- Hardware address.
- Device type.
- Group name.



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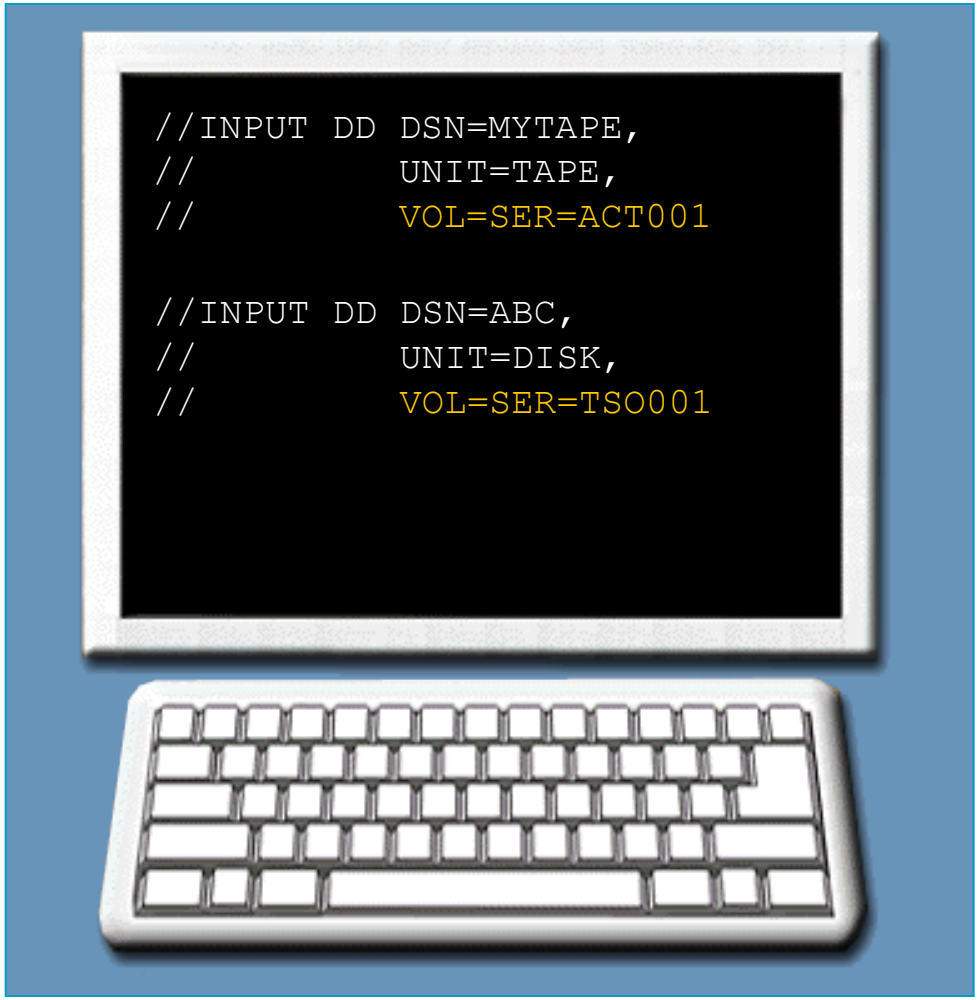
DD statement parameters - VOL.

What are the characteristics of the VOL parameter?

The Volume (VOL) parameter is used to indicate the specific media volume a tape data set has to access.

A media volume might be a specific tape volume named ACCT01 or specific disk pack named TSO001.



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DD statement parameters – SPACE.

By using the SPACE parameter the required amount of space for a data set can be allocated.

The characteristics of the SPACE parameter are:

- Coding the SPACE specifies how much room on a DASD volume the system should allocate to the new data set.

- The space can be reserved by specifying a number of blocks, tracks or cylinders.

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DD statement parameters – LABEL.

What are the characteristics of the LABEL parameter?

The label parameter indicates the type of volume labels on a tape or DASD data set, and the expiration date or the retention period.

It also specifies whether or not volume is write protected.

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DD statement parameters – DCB.

What are the characteristics of the DCB parameter?

The Data Control Block (DCB) parameter is used during execution to complete information in the program's data control block for a data set.

The DCB parameter identifies the type, block size, and length of records in a data set.

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DD statement parameters – SYSOUT.

The output stream, or SYSOUT data set, is the data set that contains the results of a job to be printed.

The SYSOUT parameter specifies a system output data set and its output class.

The DD statement routes the output to a printer of the specified output class.

The output class can be any alphanumeric character (A-Z, 0-9) or an asterisk.

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Are we on track?

Match the DD statement parameters with their descriptions.

1. UNIT	**A. The tape reel or disk pack on which a data set is stored.**
2. DSN	**B. The current status and step termination status of the data set.**
3. VOL	**C. The type of HW device used to store or access the data set.**
4. DISP	**D. The data set name.**

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Coding a DD statement.

Are we on track?

The _____ parameter in a DD statement routes the output to a printer based on the output class indicated.

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Glossary.

Volume
A DASD device like hard disk or the media like a tape reel.

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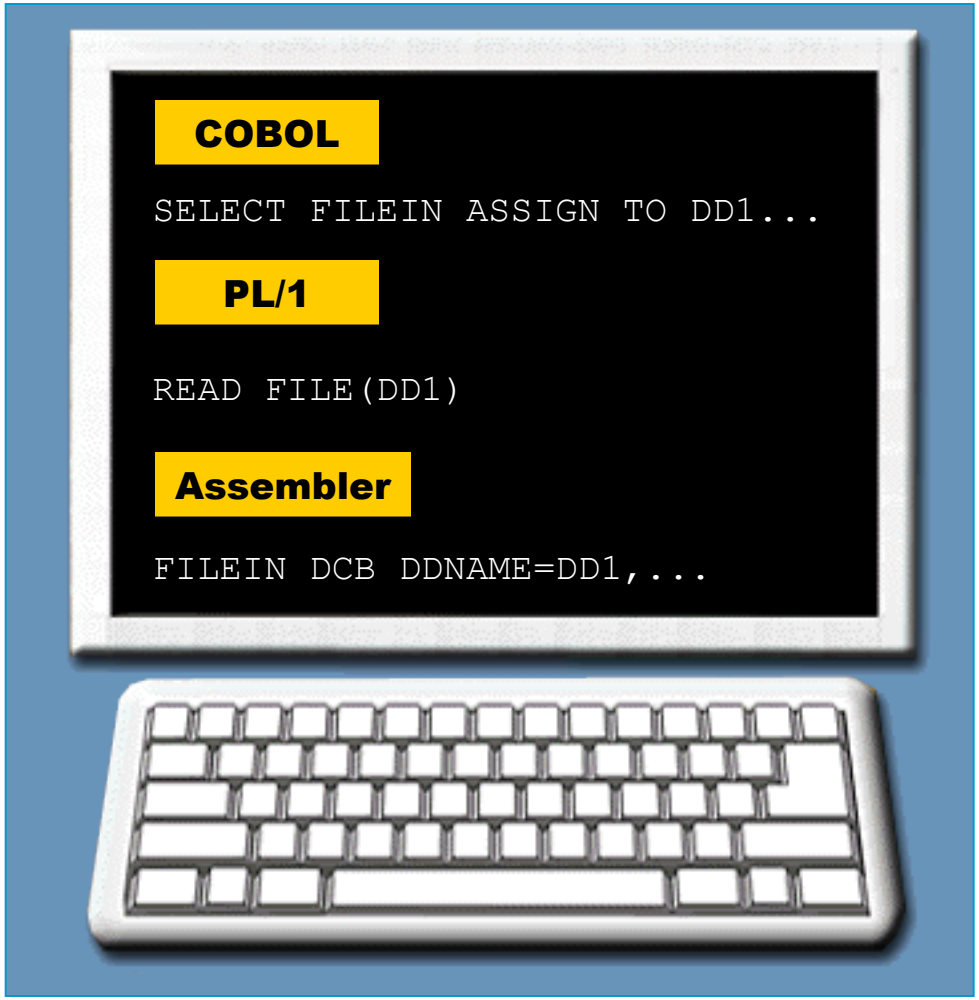
Using DDname in programs.

How do we code DDname in programs?

The format for coding a DDname in a program depends on the language in which the program is written.

The way the DDname is coded is different in COBOL, PL/1, and Assembler. In the example the DDname used is DD1.



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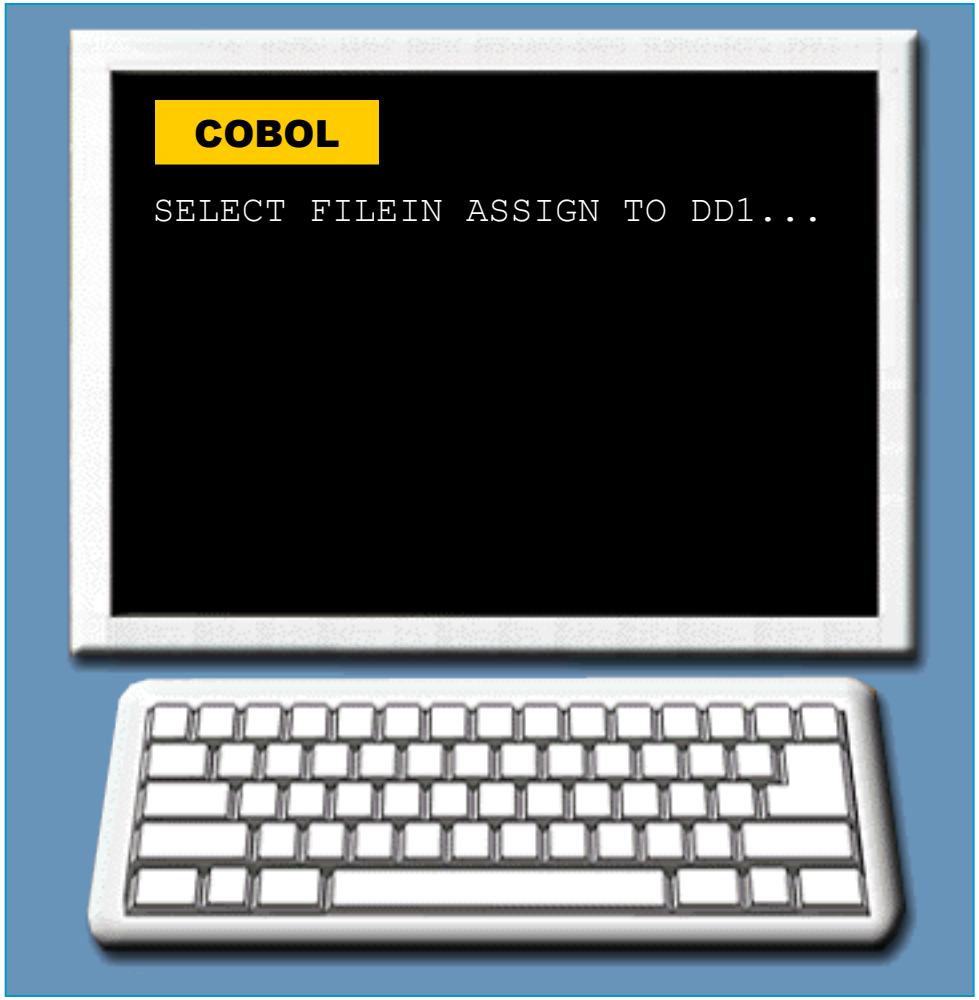
Using DDNAME in programs.

Cobol DDname definition.

How do we code the DDname in COBOL?

The ASSIGN clause in the ENVIRONMENT DIVISION of the Cobol program identifies the DDname that must be used in the DD statement.



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Using DDNAME in programs.

Assembler DDname definition.

How do we code the DDname in Assembler?

In an Assembler program, the DDname is indicated as a keyword parameter of the DCB macro.

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SMS considerations.

What is a SMS?

A Storage Management Subsystem (SMS) may be an optional facility at the installation. When installed and active, the SMS manages many data sets within the installation.

If the SMS is active, the storage administrator at the installation decides which data sets it manages.

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SMS considerations.

What are the characteristics of SMS?

The characteristics of SMS include:

- SMS can manage:
  - ✓ Physical sequential data sets (PS).
  - ✓ Partitioned data sets (PDS).
  - ✓ Partitioned data sets extended (PDSE).
  - ✓ VSAM data sets.
- SMS does not manage tape or SYSOUT data sets.

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SMS considerations.

How does SMS affect the JCL?

- In general existing JCL continues to perform correctly with SMS installed and activated. SMS provides the benefit of data class, management class and storage class constructs without necessarily changing existing JCL.
- Installation-defined Automatic Class Selection (ACS) routines can be used to select appropriate characteristics for data sets, eliminating the necessity of coding some JCL parameters.

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Glossary.

Automatic Class Selection (ACS)
A set of routines that assign classes to data, based on its requirements and attributes and select the target storage group.

Partitioned Data Set (PDS)
A data set on DASD that is divided into partitions, called members, each of which can contain a program, part of the program, or data.

Partitioned Data Set Extended (PDSE)
A data set that contains an indexed directory and members that are similar to the directory and members of partitioned data sets.

Storage Management Subsystem (SMS)
A DFSMS facility used to automate and centralize the management of storage.

Virtual Storage Access Method (VSAM)
An access method for direct or sequential processing of fixed and variable-length records on DASDs.

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Unit summary.

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

- **Identify how to connect a DD statement to the program requirement for input/output.**

- **Identify the number of DD statements required for a given program.**

- **Understand the advantages of identifying the application data set and its location at program initiation time.**

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JCL

Chapter a4
Coding DD statements

See „z/OS MVS JCL Reference“ manual.

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Chapter a3. Coding EXEC statements

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Chapter a6. Conditional processing

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Chapter a4

Coding DD statements

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Course objectives.

Be able to:

- Identify how to connect a DD statement to the program requirement for input/output.
- Identify the number of DD statements required for a given program.
- Understand the advantages of identifying the application data set and its location at program initiation time.

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A program needs to be told which data sets to use during execution. This is accomplished by coding one or more Data Definition (DD) statements in the JCL.
DD statements specify which data sets the program has to use during execution.

The characteristics of each data set appears in the DD statement not in the individual program.

Coding a DD statement.

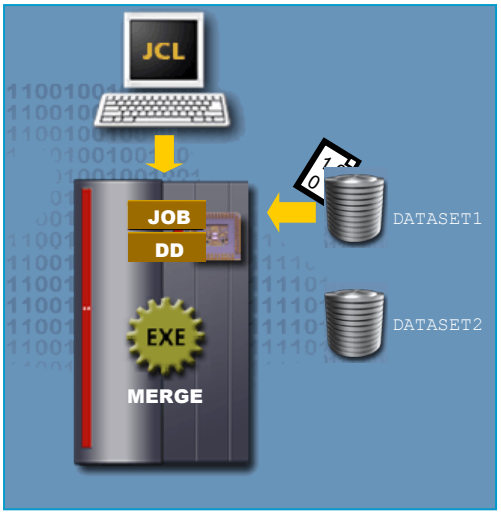
Defining a DD statement.

What is a DD statement?

Each data set used or created in a job step requires a separate DD statement.

In the example three data sets are involved, so three separate DD statements are required in the JCL, one for each data set.

A program called MERGE reads a particular data set (DATASET1).



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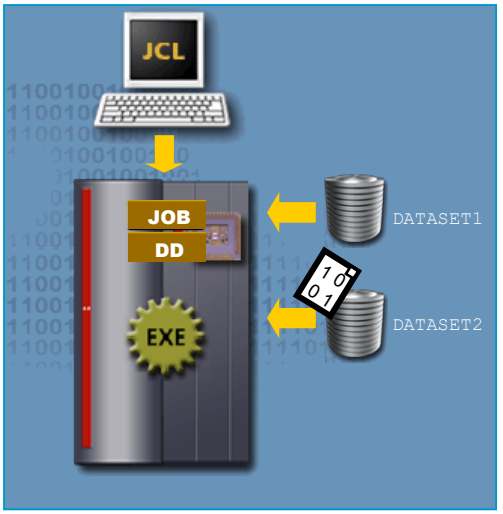
Syntax:

// [ddname] DD [positional-parameter][,keyword-parameter]...[comments]
[procstepname.ddname] // [ddname] DD [procstepname.ddname]

See „z/OS MVS JCL Reference“ manual.

Defining a DD statement.

During the course of the execution, this data set receives updates from the second data set (DATASET2).



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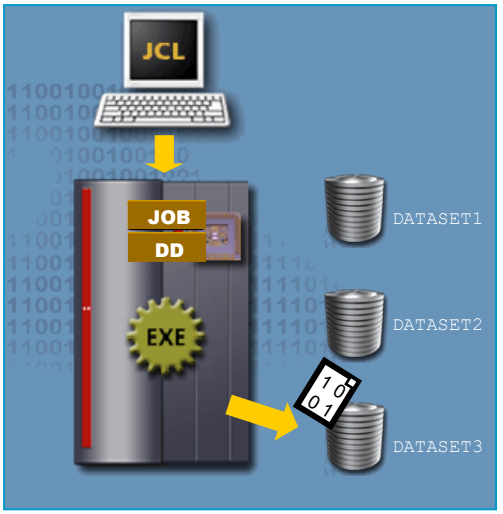
Coding a DD statement.

Defining a DD statement.

The result of this update creates a new data set (DATASET3).



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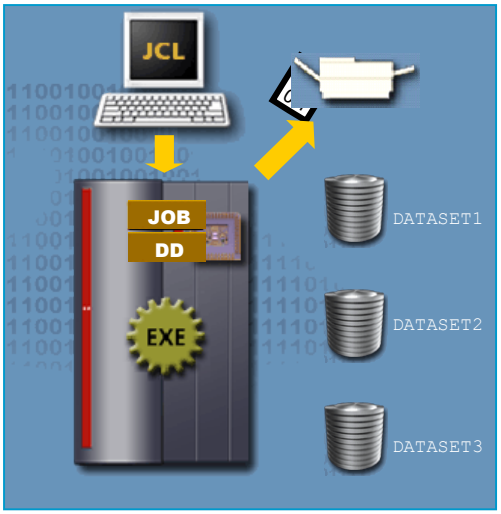
Coding a DD statement.

DD statements – SYSOUT.

If the program also prints an output listing a fourth DD statement must be coded into the accompanying JCL.

This one is for the SYSOUT data set that is spooled and eventually printed.



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```
//DD1      DD    SYSOUT=P
```

In this example, the DD statement specifies that JES is to write the SYSOUT data set to the device handling class P output.

Coding a DD statement.

Are we on track?

The system accesses a member of a private library in order to run a program, then sends the output to a printer. How many DD statements would the JCL for the job contain?

A. Three

B. None

C. One

D. Two

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The correct answer is D.

Coding a DD statement.

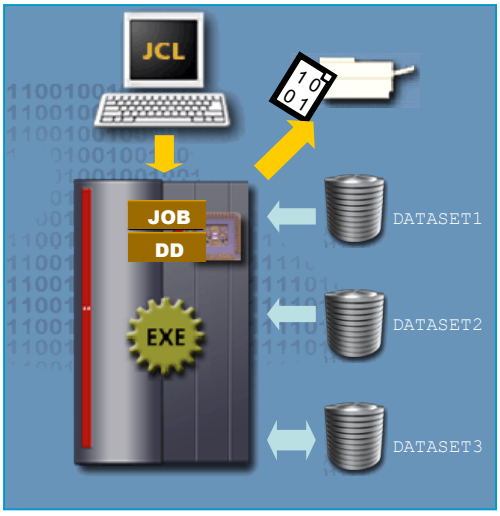
The DD statement syntax.

The syntax used for coding a DD statement is:

```
//ddname DD parameter(s)
```

The DD statement identifies the basic information about a data set including:

- DDname used by the program to reference a data set.
- The data set name.
- The location of the data set.
- The manner in which data set should be accessed.



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Coding a DD statement.

Are we on track?

Code a DD statement using the following information:

The DDname is DD1 and parameter is DSN=WEEKLY

```
//JOB1      JOB   255,SMITH
//STEP1     EXEC  PGM=PAYROLL
//DD1        DD
```

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The correct answer is: //DD1 DD DSN=WEEKLY

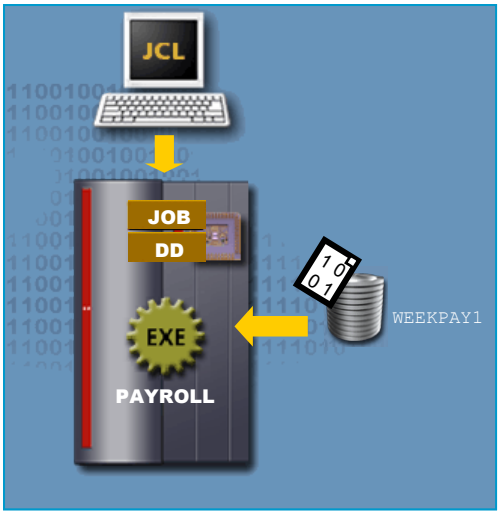
Coding a DD statement.

DD statement – an example.

The PAYROLL program might specify a DDname of PAY for the weekly payroll data set. The program uses DDname PAY to point to the data set for input to the payroll program.

If the payroll data set for that week is WEEKPAY1, then the JCL might appear as:

```
//MYJOB     JOB
//STEP1     EXEC   PGM=PAYROLL
//PAY       DD     DSN=WEEKPAY1
```



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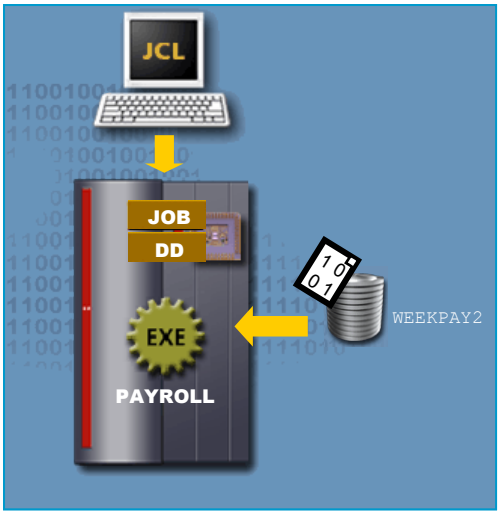
Coding a DD statement.

DD statement – an example.

The following week, the payroll data set is WEEKPAY2. The program can use the same DDNAME (PAY), the JCL has to refer to the WEEKPAY2 data set like this:

```
//MYJOB     JOB
//STEP1     EXEC   PGM=PAYROLL
//PAY       DD     DSN=WEEKPAY2
```



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As you saw in the example, the weekly modification is all the system needs to run the program. The PAYROLL program does not have to be changed. When you specify the characteristics of a data set in JCL rather than in the program, your installation can adapt. The installation can change data set information, such as the DSN, medium, and location, without having to change and recompile the programs that access the data set.

Advantage of using DD statements in the JCL.

The advantages of using DD statements in JCL are:

- **It allows the data set information to change without recompiling the programs that access the data set.**
- **It increases reusability of programs.**
- **The installation becomes more adaptable.**

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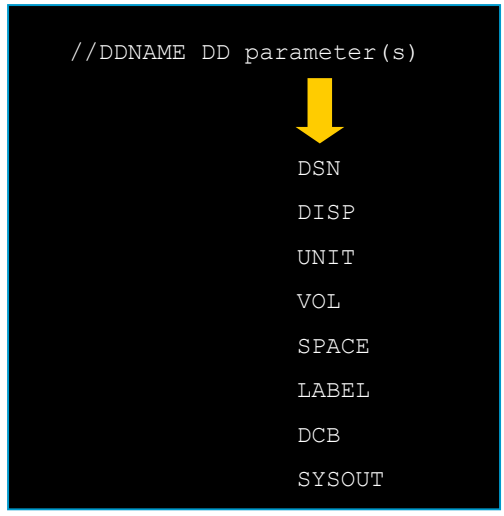
Coding a DD statement.

DD statement parameters.

The characteristics of DD statement parameters are:

- Adding parameters in the DD statement allows us to specify the characteristics of a data set.
- DD statement parameters can be coded in any order as they are keyword parameters.



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Use the **DSNAME** parameter to specify the name of a data set.

Use the **DISP** parameter to describe the status of a data set to the system and tell the system what to do with the data set after termination of the step or job. You can specify one disposition for normal termination and another for abnormal termination.

Use the **UNIT** parameter to ask the system to place the data set on:

•A specific device.

•A certain type or group of devices.

•The same device as another data set.

Use the **VOLUME** to identify the volume or volumes on which a data set resides or will reside.

Use the **SPACE** parameter to request space for a new data set on a direct access volume.

Use the **LABEL** parameter to specify for a tape or direct access data set:

•The type and contents of the label or labels for the data set.

•If a password is required to access the data set.

•If the system is to open the data set only for input or output.

•The expiration date or retention period for the data set.

Use the **DCB** to complete during execution the data set information in the data control block.

Use the **SYSOUT** to identify this data set as a system output data set (SYSOUT).

Coding a DD statement.

DD statement parameters – DSN.

What are the characteristics of the DSN parameter?

The characteristics of the DSN parameter are:

- The Data Set Name (DSN) parameter specifies the name of the data set.
- Data sets are either temporary or non-temporary.

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DSNAME Parameter

Parameter Type

Keyword, optional

Purpose

Use the DSNAME parameter to specify the name of a data set. For a new data set, the specified name is assigned to the data set; for an existing data set, the system uses the name to locate the data set.

Coding a DD statement.

Temporary data sets.

The characteristics of a temporary data set are:

- **Temporary data set is used for storage within the life cycle of the job.**
- **Naming a temporary data set is optional.**
- **Temporary data set names can be coded either by including two ampersands (&&) before the name or by leaving out the DSN parameter.**
- **The syntax used in coding temporary data sets is:**

```
//DATA1    DD DSN=&&FIRST
           or
//DATA1    DD (all needed parameters except DSN parameter)
```

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When the DSN parameter is omitted the system assigns a unique name.

SMS manages a temporary data set if you specify a storage class (with the DD STORCLAS parameter) or if an installation-written automatic class selection (ACS) routine selects a storage class for the temporary data set.

Try to submit 'MCOE.EDU.JCL.JCL(LASMCLG)' to see temporary data sets coming from SYS1.PROCLIB(HLASMCLG).

Non-temporary data sets.

The characteristics of a non-temporary data set are:

- **Non-temporary data sets can be saved and reused after the job has completed.**
- **Non-temporary data sets must be given a data set name.**
- **The syntax used in coding non-temporary data sets is:**

```
//DATA2     DD DSN=SECOND
```


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Coding a DD statement.

DD statement parameters – DISP.

The data set disposition (DISP) parameter specifies the current status of a data set and tells the system which method to use for handling the data set after the job step terminates.

- The current status of a data set can be: Old, New, Mod, Shared.
- The method of handling a data set after termination can be: Delete, Keep, Catalog.

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For example, the DISP parameter can tell the system to delete a temporary data set at the end of a job or save a non-temporary data set. The DISP statement can also setup a data set to be shared or passed to another job, cataloged in a library, or used to create a new data set.

DISP Parameter

Parameter Type

Keyword, optional

Purpose

Use the DISP parameter to describe the status of a data set to the system and tell the system what to do with the data set after termination of the step or job. You can specify one disposition for normal termination and another for abnormal termination.

Coding a DD statement.

DD statement parameters - UNIT.

What are the characteristics of the UNIT parameter?

The I/O UNIT parameter is used to request the type (or group) of hardware device(s) used to store or access a data set.

Interaction with I/O devices can be accomplished by specifying its:

- Hardware address.
- Device type.
- Group name.

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Using the UNIT parameter, you can specify a particular tape drive, printer, or DASD device based on its hardware address, device type or group name.

UNIT Parameter

Parameter Type

Keyword, optional

Note:

With SMS, you do not need to use the UNIT parameter to specify a device for an SMS-managed data set. Use the STORCLAS parameter or let an installation-written automatic class selection (ACS) routine select a storage class for the data set.

Purpose

Use the UNIT parameter to ask the system to place the data set on:

•A specific device.

•A certain type or group of devices.

•The same device as another data set.

Coding a DD statement.

DD statement parameters - VOL.

What are the characteristics of the VOL parameter?

The Volume (VOL) parameter is used to indicate the specific media volume a tape data set has to access.

A media volume might be a specific tape volume named ACCT01 or specific disk pack named TSO001.

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A media on a storage device such as a tape reel or a Direct Access Storage Device (Disk unit) is called a volume.

VOLUME Parameter

Parameter Type

Keyword, optional

Purpose

Use the VOLUME parameter to identify the volume or volumes on which a data set resides or will reside. You can request:

- A private volume.
- Retention of the volume.
- A specific volume by serial number.
- The same volume that another data set uses.

Coding a DD statement.

DD statement parameters – SPACE.

By using the SPACE parameter the required amount of space for a data set can be allocated.

The characteristics of the SPACE parameter are:

- Coding the SPACE specifies how much room on a DASD volume the system should allocate to the new data set.
- The space can be reserved by specifying a number of blocks, tracks or cylinders.

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SPACE Parameter

Parameter Type

Keyword, optional

Purpose

Use the SPACE parameter to request space for a new data set on a direct access volume. You can request space in two ways:

•Tell the system how much space you want and let the system assign specific tracks.

•Tell the system the specific tracks to be allocated to the data set.

Letting the system assign the specific tracks is most frequently used. You specify only how space is to be measured — in tracks, cylinders, blocks, or records — and how many of those tracks, cylinders, blocks, or records are required.

The SPACE parameter has no meaning for tape volumes.

Coding a DD statement.

DD statement parameters – LABEL.

What are the characteristics of the LABEL parameter?

The label parameter indicates the type of volume labels on a tape or DASD data set, and the expiration date or the retention period.

It also specifies whether or not volume is write protected.

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LABEL Parameter

Parameter Type Keyword, optional

Purpose

Use the LABEL parameter to specify for a tape or direct access data set:

- The type and contents of the label or labels for the data set.
- If a password is required to access the data set.
- If the system is to open the data set only for input or output.
- The expiration date or retention period for the data set.

For a tape data set, this parameter can also specify the relative position of the data set on the volume.

Coding a DD statement.

DD statement parameters – DCB.

What are the characteristics of the DCB parameter?

The Data Control Block (DCB) parameter is used during execution to complete information in the program's data control block for a data set.

The DCB parameter identifies the type, block size, and length of records in a data set.

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DCB Parameter

Parameter Type Keyword, optional

Purpose

Use the DCB parameter to complete during execution the data set information in the data control block (DCB).

The data control block is constructed by the DCB macro instruction in assembler language programs or by file definition statements or language-defined defaults in programs in other languages.

Coding a DD statement.

DD statement parameters – SYSOUT.

The output stream, or SYSOUT data set, is the data set that contains the results of a job to be printed.

The SYSOUT parameter specifies a system output data set and its output class.

The DD statement routes the output to a printer of the specified output class.

The output class can be any alphanumeric character (A-Z, 0-9) or an asterisk.

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The output class in an installation can be used for printing on special forms or for high-volume and high-priority output.

The asterisk tells the system to use the same class as the MSGCLASS parameter in the JOB statement.

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.

Coding a DD statement.

Are we on track?

Match the DD statement parameters with their descriptions.

1. UNIT	**A. The tape reel or disk pack on which a data set is stored.**
2. DSN	**B. The current status and step termination status of the data set.**
3. VOL	**C. The type of HW device used to store or access the data set.**
4. DISP	**D. The data set name.**

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The correct answer is 1-C, 2-D, 3-A, and 4-B.

Coding a DD statement.

Are we on track?

The _____ parameter in a DD statement routes the output to a printer based on the output class indicated.

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The correct answer is SYSOUT

Glossary.

Volume
A DASD device like hard disk or the media like a tape reel.

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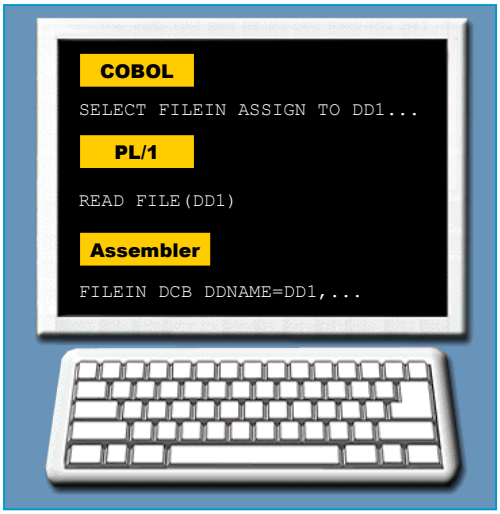
Using DDNAME in programs.

Using DDname in programs.

How do we code DDname in programs?

The format for coding a DDname in a program depends on the language in which the program is written.

The way the DDname is coded is different in COBOL, PL/1, and Assembler. In the example the DDname used is DD1.



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DDNAME Parameter

Parameter Type

Keyword, optional

Purpose

Use the DDNAME parameter to postpone defining a data set until later in the same job step. A DDNAME parameter on a DD statement in a cataloged or in-stream procedure allows you to postpone defining the data set until a job step calls the procedure; the data set must be defined in the calling job step.

Syntax

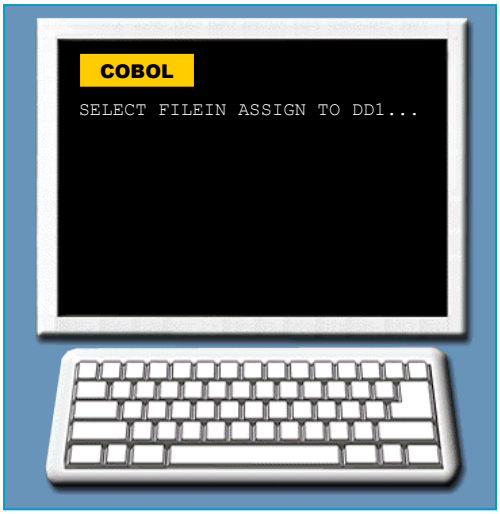
DDNAME=ddname

Using DDNAME in programs.

Cobol DDname definition.

How do we code the DDname in COBOL?

The ASSIGN clause in the ENVIRONMENT DIVISION of the Cobol program identifies the DDname that must be used in the DD statement.



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See MCOE.EDU.JCL.SOURCE(IGYTCARB, COBTEST).

Using DDNAME in programs.

Assembler DDname definition.

How do we code the DDname in Assembler?

In an Assembler program, the DDname is indicated as a keyword parameter of the DCB macro.

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See MCOE.EDU.JCL.SOURCE(EXAMPLE1).

Using DDNAME in programs.

SMS considerations.

What is a SMS?

A Storage Management Subsystem (SMS) may be an optional facility at the installation. When installed and active, the SMS manages many data sets within the installation.

If the SMS is active, the storage administrator at the installation decides which data sets it manages.

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DFSMS is comprised of the following functional components:

•**DFSMSdfp** = Data Facility Storage Management Subsystem Data Facility Product:

A functional component that provides functions for storage management, data management, program management, device management, and distributed data access.

DFSMSdfp and the Base Control Program (BCP) form the foundation of the z/OS operating system where DFSMSdfp performs the essential data, storage, and device management functions of the system.

•**DFSMSdss** = Data Facility Storage Management Subsystem Data Set Services:

A functional component used to copy, move, dump, and restore data sets and volumes. DFSMSdss is the primary data mover of DFSMS/MVS.

•**DFSMShsm** = Data Facility Storage Management Hierarchical Storage Manager:

A DFSMS/MVS functional component used for backing up and recovering data, and managing space on volumes in the storage hierarchy.

•**DFSMSrmm** = Data Facility Storage Management Removable Media Manager:

A DFSMS/MVS functional component that manages removable media.

Using DDNAME in programs.

SMS considerations.

What are the characteristics of SMS?

The characteristics of SMS include:

- SMS can manage:
  - ✓ Physical sequential data sets (PS).
  - ✓ Partitioned data sets (PDS).
  - ✓ Partitioned data sets extended (PDSE).
  - ✓ VSAM data sets.
- SMS does not manage tape or SYSOUT data sets.

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SMS supplies default information and simplifies JCL coding for data sets it manages.

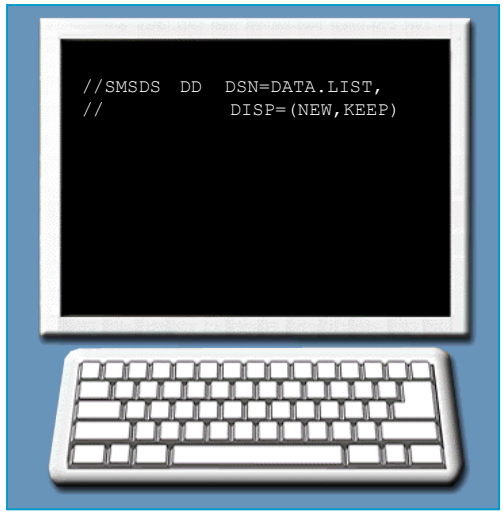
For instance, SMS may decide which units and volumes are to be used for newly created data sets, freeing you from coding UNIT and VOLUME on DD statements.

Using DDNAME in programs.

SMS considerations.

How does SMS affect the JCL?

- In general existing JCL continues to perform correctly with SMS installed and activated. SMS provides the benefit of data class, management class and storage class constructs without necessarily changing existing JCL.
- Installation-defined Automatic Class Selection (ACS) routines can be used to select appropriate characteristics for data sets, eliminating the necessity of coding some JCL parameters.



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For example, you can code the DDNAME, the data set name, and disposition to create a new data set. You can use installation-written ACS routines to assign data class, storage class, and management class for the data set DATA.LIST. You do not need to code the specifics about space requirements and storage location when creating the data set.

Using DDNAME in programs.

Glossary.

Automatic Class Selection (ACS)
A set of routines that assign classes to data, based on its requirements and attributes and select the target storage group.

Partitioned Data Set (PDS)
A data set on DASD that is divided into partitions, called members, each of which can contain a program, part of the program, or data.

Partitioned Data Set Extended (PDSE)
A data set that contains an indexed directory and members that are similar to the directory and members of partitioned data sets.

Storage Management Subsystem (SMS)
A DFSMS facility used to automate and centralize the management of storage.

Virtual Storage Access Method (VSAM)
An access method for direct or sequential processing of fixed and variable-length records on DASDs.

Unit summary.

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

- **Identify how to connect a DD statement to the program requirement for input/output.**
- **Identify the number of DD statements required for a given program.**
- **Understand the advantages of identifying the application data set and its location at program initiation time.**

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