



GETTING STARTED WITH BATCH (TOPS-10)

AA-D303A-TB

August 1978

This document describes to the reader how to get started with the TOPS-10 GALAXY Batch System.

OPERATING SYSTEM: TOPS-10 Version 6.03A

SOFTWARE VERSION: GALAXY Version 3

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First Printing, August 1978

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PREFACE

Getting Started With Batch (TOPS-10) has been written for you, if you have a rudimentary knowledge of Batch processing or are familiar with at least one of the following:

1. a programming language
2. the timesharing services of the DECsystem-10
3. card processing on other systems

HOW TO USE THIS MANUAL

If you input your jobs through interactive terminals, the following chapters are recommended:

- Chapter 1 Introduction
- Chapter 2 Entering a Batch Job from a Terminal
- Chapter 4 Interpreting Your Printed Output, Section 4.4.1
- Chapter 5 Using the Terminal to Enter Jobs, Section 5.1

If you input your jobs from cards, the following chapters are recommended:

- Chapter 1 Introduction
- Chapter 3 Entering a Batch Job from Cards
- Chapter 4 Interpreting Your Printed Output, Section 4.4.2
- Chapter 5 Using Cards to Enter Jobs, Section 5.2

REFERENCES

Not all of the commands and card formats for Batch processing are described in this manual. If you want to know more about Batch you can refer to the DECsystem-10 (TOPS-10) Batch Reference Manual. In addition, all components of Batch processing are referred to as Batch in this manual. For a complete description of these components, refer to the DECsystem-10 (TOPS-10) Batch Reference Manual.

An elementary description of the basic TOPS-10 system commands can be found in the documents Getting Started With DECsystem-10 (TOPS-10) and Getting Started With TOPS-10 Commands. The DECsystem-10 (TOPS-10) Operating System Commands Manual contains additional descriptions of the TOPS-10 commands available to you.






Error messages that occur while Batch is processing but which are not defined in this manual are explained in applicable system manuals. For example, if your FORTRAN program fails to compile successfully, the error message you receive from the FORTRAN compiler can be found in the FORTRAN-10 Programmer's Reference Manual. For errors that may occur in a Batch process but not in the source program being used, you can refer to the DECsystem-10 (TOPS-10) Batch Reference Manual.

CONVENTIONS USED IN THIS MANUAL

The following is a list of symbols and conventions used in this manual.

dd-mmm-yy hh:mm	A set of alphanumeric characters that indicates date and time; e.g., 2-APR-78 15:30. Time of day is represented by a 24-hour notation; 15:30 means 3:30 P.M.
filename.ext	The filename and file extension of a file. The filename can be 1 to 6 alphanumeric characters in length and the file extension can be 1 to 3 alphanumeric characters in length. The file extension may be optional. If present, the file extension must be separated from the filename with a period. Refer to the Glossary for the definitions of these terms.
hh:mm:ss	A set of numbers representing time in the form hours:minutes:seconds. Leading zeros can be omitted, but colons must be present between two numbers. For example, 5:35:20 means 5 hours, 35 minutes, and 20 seconds.
jobname	The name that is assigned to a job. It can contain up to six characters. Refer to the Glossary for the definition of a job.
n	A number that specifies either a required number or an amount of things such as cards or line-printer pages. This number can contain as many digits as are necessary to specify the amount required, e.g., 5, 13, 219, etc.
[proj,prog]	The user number assigned to each user, commonly called a project-programmer number. The two numbers that make up the project-programmer number must be separated by a comma. Refer to the Glossary for the definition of a project-programmer number.
t	A number representing an amount of time, usually in minutes. This number can contain as many digits as are necessary to specify the amount of time required, e.g., 7, 40, 120, etc.
x	An alphanumeric character.

SYMBOLS USED IN THIS MANUAL

Symbol	Meaning
.TYPE	Anything you type on your terminal appears in red. Anything the system prints on your terminal appears in black.
	Press the key labeled RETURN or CR.
	Press the key labeled DELETE or RUBOUT.
	Press the key labeled ESC, ESCAPE, ALT, or PRE.
	Press the key labeled TAB.
	Press the space bar once.
[]	Brackets enclose all optional arguments.
()	Parentheses enclose the name or value of an argument.

CHAPTER 1

INTRODUCTION

1.1 WHAT BATCH IS

Many data processing jobs may require long running times and may make few demands of you. Ideally these jobs should be run in your absence when the computer is not busy with other tasks. This ideal is met by the TOPS-10 Batch system.

Batch is a group of programs that allows you to submit a job to the TOPS-10 system on a leave-it basis. (Refer to the DECsystem-10 (TOPS-10) Batch Reference Manual for a complete description of programs that constitute the Batch system.) You may build and submit your job in one of two ways:

1. By entering your data directly to an interactive computer system by means of a timesharing terminal.
2. By entering your data from punched-cards to the interactive system. The cards are given to an operator who, at an appropriate time in his schedule, enters them into the computer through a card reader.

One advantage of Batch processing with an interactive system is that the interactive capabilities may be employed to greatly reduce the amount of time required to prepare the job for entry. By using a terminal to enter and edit the program items and data to be processed, you can bypass the tedious chore of preparing card decks. However, if desired, you can prepare traditional card decks by employing the punched card facilities of the system. In either case, the information to be entered is prepared as if it were to be processed as a normal job from an interactive terminal. The only added requirement is that special commands are entered with the job to direct the system in your absence. In other words, you anticipate the questions the system normally asks and you answer them when you enter the interactive job.

After preparing the job, you are free to leave the system. Upon accepting the job, the system classifies it in terms of size, running time, the need for peripherals, etc. This classification is used as the basis for determining when the job is to be run. Large jobs may, therefore, be set aside until smaller or more urgent jobs are finished.

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Some of the jobs that are commonly processed through the TOPS-10 Batch system are those that:

1. are frequently run for production
2. are large and long running
3. require large amounts of data
4. need no actions by you when the jobs are running

Batch allows you to submit your job to the computer through either a card deck given to an operator or a timesharing terminal, and to receive your output from the operator when the job has finished. Output is never returned to your timesharing terminal even if your job is entered from one. Instead, it is sent to a peripheral device (normally the line printer) at the computer site and returned to you in the manner designated by the installation manager.

1.2 HOW TO USE BATCH

To use the Batch system to process your job, you must create a control file. A control file consists of various commands that tell the TOPS-10 system what you want to process. The control file commands can be created as a disk file or as card input and can consist of:

1. System commands (see the DECsystem-10 (TOPS-10) Operating System Commands Manual),
2. System program commands to system programs, and
3. Batch commands (see Chapters 2 and 3).

These commands, when submitted to the operating system, must be in a particular order so that your Batch job will execute correctly.

The steps that you must take to create a control file from a timesharing terminal are described in Chapter 2. The steps to take to create a control file from cards are described in Chapter 3.

1.2.1 Running Your Job

After you submit the job, it waits in a queue with other jobs until Batch schedules it to run under guidelines established by the installation manager. Several factors affect how long your job waits in the queue, for example, its estimated execution time and the priority of your job compared with other waiting jobs.

When the job is started, Batch reads the control file to determine what actions are necessary to complete the job. For example, if there are commands to the system programs, Batch issues the commands to those programs. Any output produced as a result of those commands is stored in a log file for listing later. With adequate planning, the control file can also provide for corrective actions in the event of errors.

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As each step in the control file is performed, Batch records it in a log file. For example, if a system command such as COMPILE is executed, Batch passes it to the system and writes it in the log file. The system response is also written in the log file. Batch writes in the log file any response from your job that would have been written on the terminal if the job had run interactively.

1.2.2 Receiving Your Output

Your program output will be returned to you in the form that you specified by the commands in your control file. This is normally the line-printer listing, but may also be output on magnetic tape, disk, DECTape, or cards. When your output is directed to the line printer, you may specify the approximate number of pages that you require (to help Batch restrain runaway programs).

If your Batch job is submitted through a timesharing terminal, the log file is written and saved on disk in your directory and printed on the line printer. If your Batch job is submitted on card input, the log file is written on disk in your directory, printed on the line printer, and then deleted from your directory.

1.2.3 Recovering from Errors

If an error occurs in your job, either within a program that is executing or within the control file, Batch writes the error message in the log file and usually terminates the job. You can, however, include commands in the control file to direct Batch to branch to recovery sequences in the event of an error and thereby allow completion of the job. The effectiveness of error recovery is dependent on your ability to predict potential trouble spots within the program or within commands used in the control file. (Refer to the DECSYSTEM-10 (TOPS-10) Batch Reference Manual for detailed descriptions on error recovery for Batch jobs.)

1.3 SUMMARY

The steps that you must perform to enter a job to the computer through Batch are as follows:

1. Create a control file either on cards or from a terminal.
2. Submit the job to Batch, either indirectly via the operator (for a card job) or directly from a terminal.
3. Obtain and examine the log file listing and the job output to determine if the desired results were obtained.

Sample jobs run through Batch from cards and from a terminal are shown in Chapter 5.

CHAPTER 2

ENTERING A BATCH JOB FROM A TERMINAL

When you submit a job to Batch from a timesharing terminal, you must create a control file that Batch can use to run your job. The control file contains all the commands that you would use to run your job if you were running under timesharing. For example, if you wanted to compile and execute a program called MYPROG.CBL, the typeout on a timesharing terminal would appear as follows:

```
.COMPILE MYPROG.CBL (RET)           (Your request)
COBOL: MYPROG [MYPROG.CBL]         (The system's reply)
EXIT
                                     (The system's reply)

.EXECUTE MYPROG.CBL (RET)           (Your request)
LINK:  LOADING
[LINKXCT MYPROG EXECUTION]        (The system's reply)
EXIT
```

To create a control file to tell Batch to run the same, you would create the following:

```

  SP
  ↓
.SOS MYFILE.CTL (RET)
INPUT: MYFILE.CTL
00100 .COMPILE MYPROG.CBL (RET)
00200 .EXECUTE MYPROG.CBL (RET)
00300 $
      ↑
      ESC
*E (RET)

[DSKC:MYFILE.CTL]
```

When the job is run, the commands are passed to the system to be executed. The commands and their replies from the system are written in the log file so that the entire dialogue shown in the first example above appears in the log file.

ENTERING A BATCH JOB FROM A TERMINAL

2.1 CREATING THE CONTROL FILE

To create a control file and submit it to Batch from a terminal, you must perform the following steps:

1. LOGIN to the system as a timesharing user.
2. Create a control file on disk using SOS (or TECO).
3. Submit the job to Batch using the system command SUBMIT.

You can then wait for your output to be returned at the designated place.

After you have logged into the system as you normally would to start a timesharing job, you can use SOS (or TECO) to create your control file.

The control file can contain TOPS-10 Monitor commands, program commands, data that would normally be entered from a terminal, and Batch commands. The Batch commands are described in Section 2.3. What you write in the control file depends on what you wish your job to accomplish. An example of a job that you can enter for Batch processing is as follows:

1. Compile a program that is on disk.
2. Load and execute the program using data from a file already on disk.
3. Print the output on the line printer.
4. Write the output into a disk file also.
5. Compile a second program.
6. Load and execute the second program using the data output from the first program.
7. Print the output from the second program.

The control file that you would create for the preceding job would appear as follows:

```

      (SP)
      ↓
.SOS MYFILE.CTL (RET)
INPUT: MYFILE.CTL
00100 .COMPILE MYPROG.FOR/COMPILE (RET)
00200 .EXECUTE MYPROG.FOR (RET)
00300 .COMPILE PROG2.FOR/COMPILE (RET)
00400 .EXECUTE PROG2.FOR (RET)
00500 $
      ↑
      (ESC)
*E (RET)

[DSKC:MYFILE.CTL]
.
```

ENTERING A BATCH JOB FROM A TERMINAL

Include statements in your programs (rather than in the control file) to read the data from the disk files and write the output to the printer and the disk. The output to the line printer is written along with your log file as part of the total output of your job.

If an error occurs in your job, Batch will not continue but will terminate the job. To avoid having your job terminated because an error occurs, you can specify error recovery in the control file using special Batch commands. Error recovery is described in Section 2.4.

Any system command that you can use in a timesharing job can be used in a Batch job with the following exceptions. The ATTACH and SET TIME commands are illegal in a Batch job. If you include either of these commands in your job, Batch will process the command and the monitor will place an error message into your log file. Your Batch job will terminate unless you specify error recovery.

Do not include a LOGIN command in your control file since Batch logs the job for you. If you put in a LOGIN command, your job will be terminated. In addition, you do not need to include a KJOB command. Batch will log out your job automatically when it reaches the end of your control file.

2.1.1 Format of Lines in the Control File

Since you can put TOPS-10 monitor commands, program commands, and Batch commands, as well as data, into the control file, you have to tell Batch what kind of line it is reading. Batch determines the line it is reading as a command, data, or comment by the first nontab or nonblank character. The first character in each line should be one of the characters described below.

To put a system command or Batch command into your control file, you must put a period (.) in the first column and follow it immediately with the command.

To put a command string of a system program or user program into your control file, put an asterisk (*) in column 1 and follow it immediately with the command string. For the format of the command string, refer to the manual for the specific program that you wish to use.

If you want to include in the control file a command to a system program that does not accept a carriage return as the end of the line, e.g., DDT, you must substitute an equal sign (=) for the asterisk so that Batch will suppress the carriage return at the end of the line.

To include data for your program in the control file, write it as you would input data from a separate file. The asterisk (*) should always be the first character before each line of data input. The asterisk (*) tells Batch that this line is input data to your program.

Comments can also be included in the control file either as separate lines or on lines containing other information. To include a comment on a separate line, you must put an exclamation point (!) in column 1 and follow it with the comment. To add a comment to a line after your data, you must precede the comment with an exclamation point (!). Refer to the manual that describes the program you are using, as some programs and their input do not accept comments preceded by the exclamation point (!).

ENTERING A BATCH JOB FROM A TERMINAL

To include a CTRL/C in your control file, type an up-arrow and a C (^C). To include an ESCape (altmode), type an up-arrow and a left square bracket (^[).

If you put in the first column of the line any special characters other than those described, you may get unexpected results because Batch interprets other special characters in special ways.

The following example illustrates a control file, using some of the characters described above, and the resulting log file. The example uses the TOPS-10 FILCOM utility to compare two files.

```
!This batch job generates a FILCOM of two files.
!Run FILCOM and then give it a command.
.R FILCOM
*TTY:=FILE.QXT,FILE.TXT
*^C
```

```
08:48:07 BAJOB  BATCON version 103(2207) running EXAM2 sequence 5902 in stream 1
08:48:07 BAFIL  Input from DSKC:EXAM2,CTL(27,5107)
08:48:07 BAFIL  Output to DSKC:EXAM2,LOG(27,5107)
08:48:07 BASUM  Job parameters
                   Time:00:05:00  Unique:YES  Restart:NO  Output:LOG

08:48:07 MONTR
08:48:07 MONTR  ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LUCATE:26/NAME:"BROWN,E"
08:48:07 USER  JOB 42      RZ376B KL10 SYS#1026 TTY453
08:48:09 USER  [LGNJSP Other jobs same PPN:29]
08:48:09 USER  0848      01-Aug-78      Tue
08:48:10 MONTR
08:48:10 MONTR  ;
                   ;This Batch job generates a FILCOM of two files.
                   ;Run FILCOM and then give it a command.
                   ;R FILCOM

08:48:10 MONTR
08:48:10 USER
08:48:11 USER
08:48:11 USER  **TTY:=FILE,TST,FILE,TEXT
08:48:11 USER  File 1) DSKC:FILE,TST(27,5107) created: 0846 01-Aug-1978
08:48:11 USER  File 2) DSKC:FILE,TEXT(27,5107) created: 0846 01-Aug-1978
08:48:11 USER
08:48:11 USER  1)1      This file contains a spelling error.
08:48:11 USER  ***
08:48:11 USER  2)1      This file does not contain a spelling error.
08:48:11 USER  *****
08:48:11 USER
08:48:11 USER  $files are different
08:48:11 USER
08:48:11 USER  **^C
08:48:11 MONTR
08:48:11 MONTR  ,,KJOB/BATCH
08:48:11 USER
08:48:11 USER  [LGTJL Another job is still logged-in under (27,5107)]
08:48:13 USER  Job 42 User BROWN,E (27,5107)
08:48:13 USER  Logged-off TTY453 at 8:48:13 on 1-Aug-78
08:48:13 USER  Runtime: 0:00:00, KCS:4, Connect time: 0:00:06
08:48:13 USER  Disk Reads:69, Writes:7

8:48:14 LPDAT  LPTSpL version 103(2421)          RZ376B KL10 SYS#1026
8:48:14 LPDAT  Job EXAM2 sequence #5902 on LPT261 AT 1-Aug-78 8:48:14
```


ENTERING A BATCH JOB FROM A TERMINAL

2.2 SUBMITTING THE JOB TO BATCH

After you have created the control file and saved it on disk, you must enter it into the Batch queue so that it can be run. All programs and data that are to be processed when the job is run must be made up in advance or be generated during the running of the job. You can have them on magnetic tape, but if you do, you must include the TOPS-10 commands MOUNT and DISMOUNT in your control file so that the operator will mount and dismount the tape(s) to be read. (Refer to Chapter 5 for examples of a control file with these commands.)

If your programs and data reside on an on-line disk, you need not include the MOUNT and DISMOUNT command as there is no action required by the operator.

You enter your job in Batch's queue by means of the TOPS-10 SUBMIT command. This command has the form:

```
.SUBMIT jobname=control-filnam.ext/switches,log-filnam.ext/switches
```

jobname is the name that you give to your job. If this name is omitted, the monitor uses the name of the log file (log-filnam.ext).

control-filnam.ext is the name that you have given to the control file you created. You can add a file extension (.ext), but if you do not, Batch will assume a file extension of .CTL.

log-filnam.ext is the name of the log file that Batch will use. You can add a file extension (.ext), but if you do not, Batch will assume a file extension of .LOG.

You must specify the name of the control file. If the name of the log file is omitted, its name will be taken from the name of the control file.

/switches are switches to Batch to tell it how to process your job and what your output will look like. Most switches can appear anywhere in the SUBMIT command string; however, a few must be placed after the files to which they pertain. The various kinds of switches are described below.

Three categories of switches are available to you when you use the SUBMIT command to process your Batch job. These three categories are:

1. Queue-Operation switches,
2. General switches, and
3. File-Control switches.

Only one of the Queue-Operation switches can be placed in the command string because this category defines the type of queue request. The switch used can appear anywhere in the command string. Refer to the DECsystem-10 (TOPS-10) Batch Reference Manual and/or the DECsystem-10 (TOPS-10) Operating System Commands Manual for a complete list of Queue-Operation switches in the SUBMIT command.

ENTERING A BATCH JOB FROM A TERMINAL

2.2.1 General Switches

You use the general switches to define limits for your job. Such limits as pages of output and the time that your job will run can be specified as general switches. Each general switch can be specified only once in a SUBMIT command. You can put a switch anywhere in the command string.

/AFTER:hh:mm Switch

If you do not want Batch to run your job until after a certain time or until after a certain number of minutes have elapsed since the job was entered, you can include the /AFTER switch in the SUBMIT command string. To run the job after a specified time of the day, you must specify the time in the form hh:mm (for example, /AFTER:12:00 to run a job after noon). To run the job after a given amount of time has elapsed, specify the time in the form +hh:mm (for example, /AFTER:+1:00 to run the job an hour from now). If you omit the switch, Batch will schedule your job as it normally would using its defaults. If you omit the colon and/or value, the monitor will respond with an error message and terminate the SUBMIT command.

/PAGE:n Switch

Normally, Batch allows your job to print up to 200 pages. Included in this number are the log file and any compilation listings that you may request. If you need more than 200 pages for your job, you must include the /PAGE switch in the SUBMIT command to indicate the approximate number of pages that your job will print. If you include the switch without the colon and a value, the monitor will assume that you will print up to 2000 pages. If your output exceeds the number that you specified in the /PAGE switch, the excess output will be lost and the message ?LPTPLE Page Limit Exceeded will be printed. However, even if you exceed the maximum, the first 10 pages of the log file will be printed.

/TIME:hh:mm:ss Switch

Normally, Batch allows your job to use up to five minutes of central processor time. Central processor (CPU) time is the amount of time that your job runs, not the amount of time that it takes Batch to process your job. If you need more than five minutes of CPU time, you must include the /TIME switch in the SUBMIT command to indicate the approximate amount of time that you will need. If you specify the switch without the colon and a value, Batch will assume that you need one hour of CPU time. If you do not specify enough time, Batch will terminate your job when the time is up.

The value in the /TIME switch is given in the form hh:mm:ss (hours:minutes:seconds). If you specify only one number, Batch assumes that you mean seconds. Two numbers separated by a colon are assumed to mean minutes and seconds. All three numbers, separated by colons, mean hours, minutes, and seconds. For example:

/TIME:25	means 25 seconds
/TIME:1:25	means 1 minute and 25 seconds
/TIME:1:25:00	means 1 hour and 25 minutes and no seconds

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2.2.2 File-Control Switches

File-control switches allow you to specify parameters for individual files in the SUBMIT command. The control file can receive a special parameter, while the log file does not, and vice versa. If you place a file-control switch before the two filenames in the SUBMIT command, the switch applies to both files in the request. If you place the switch after one of the files in the command, it refers only to that file.

The switches, and the assumptions made if they or their values are omitted, are all subject to change by each installation. Check with the installation where you run your jobs to find out what differences exist between the values described here and those at the installation. Additional switches available for use with the SUBMIT command are defined in the DECsystem-10 (TOPS-10) Batch Reference Manual and the DECsystem-10 (TOPS-10) Operating System Commands Manual.

2.2.3 Examples of Submitting Jobs

The following are sample jobs entered to Batch by means of the SUBMIT command.

Example 1:

This control file consists of commands to compile FORTRAN program, print a listing, and execute it.

```
      SP
      ↓
,SDS MYFILE.CTL RET
INPUT: MYFILE.CTL
00100 .COMPILE MYPROG.FOR/LIST/COMPILE RET
00200 .EXECUTE MYPROG.FOR RET
00300 $
      ↑
      ESC
*E RET

[DSKC:MYFILE.CTL]
```

After the control file to compile and execute the FORTRAN program has been created and saved, you must submit the job to Batch.

```
      SP
      ↓
,SUBMIT MYFILE.CTL RET
```

When the monitor reads this SUBMIT command, it assumes the following:

1. The control filename and type are MYFILE.CTL.
2. The name of the job is MYFILE.
3. The log file will be named MYFILE.LOG.
4. Both the control file and the log file will be saved in your disk area.

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5. 200 is the maximum number of pages to be printed (/PAGE:200).
6. The maximum amount of CPU time is 5 minutes (/TIME:5:00).

Example 2:

The next example shows the control file that was created at the beginning of this chapter being submitted to Batch.

```
      SP
      ↓
TYPE MYFILE.CTL RET
00100 .COMPILE MYPROG.FOR/COMPILE
00200 .EXECUTE MYPROG.FOR
00300 .COMPILE PROG2.FOR/COMPILE
00400 .EXECUTE PROG2.FOR
```

After you have saved the control file, you can submit the job to Batch.

```
      SP
      ↓
SUBMIT MYJOB=MYFILE/TIME:20/PAGE:750/AFTER:10:00 RET
```

When the monitor reads this request, it assumes the following:

1. The name of the job is MYJOB.
2. The name of the control file is MYFILE.CTL.
3. The log file will be named MYFILE.LOG.
4. The log file will be left in your disk area after it is printed.
5. The control file will be left in your disk area.
6. 750 is the maximum number of pages that can be printed (/PAGE:750).
7. The maximum amount of CPU time that the job can use is 20 seconds (/TIME:20).
8. The job will be processed only after 10:00 A.M.

If you made an error in the SUBMIT command when you submitted either of these jobs, the monitor will type an error message on your terminal to explain your error so that you can correct it.

2.3 BATCH COMMANDS

You can write certain Batch commands in the control file to tell Batch how to process your control file. Each of these commands must be preceded by a period (.) so that Batch will recognize it. The most commonly used Batch commands are described in the following sections, but not all Batch commands are described here. For a description of all commands, refer to the DECsystem-10 (TOPS-10) Batch Reference Manual.

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2.3.1 The .IF Command

You can include the .IF command in your control file to specify an error-recovery procedure to Batch or to specify normal processing if an error does not occur. The .IF statement has the forms:

```
.IF (ERROR) statement           (The parentheses must be included.)  
.IF (NOERROR) statement        (The parentheses must be included.)
```

where

```
statement      is a command to the system, to a program, or to  
                Batch.
```

An example of the .IF (ERROR) command follows:

```
!DO A DIRECTORY IF AN ERROR OCCURS  
.IF (ERROR) .DIRECT/ALLOC  
.  
.  
.
```

An example of the .IF (NOERROR) command follows:

```
!IF NO ERROR OCCURS, GIVE A SECOND LINE OF INPUT  
.IF (NOERROR) *FILE.SCM=A.TXT,B.TXT
```

The .IF command can be used in two ways as shown in its two forms. You can include the .IF (ERROR) command in your control file at the place where you suspect an error may occur. The .IF (ERROR) command must be the next command in your control file (that is, the next line which begins with a period (.)) after an error occurs; otherwise, Batch will terminate your job. In the .IF (ERROR) command, you direct Batch to either go back or forward in your control file to find a line that will perform some task for you or that will direct the system or any other program to perform some task for you.

You can use the .IF (NOERROR) command to direct Batch or the system to perform tasks for you when an error does not occur at the point in your control file where you place the .IF (NOERROR) command. Thus, if you expect that an error will occur in your program, you can include an .IF (NOERROR) command to direct Batch in case the error does not occur, and then put the error-processing lines immediately following the command. Refer to Section 2.4 for more examples of using .IF (NOERROR) and .IF (ERROR).

If an error occurs and Batch does not find an .IF command as the next command line in the control file, Batch terminates the job.

2.3.2 The .ERROR Command

With the .ERROR command, you can specify to Batch the character that you wish to be recognized as the beginning of an error message. Normally, when Batch reads a message that begins with a question mark (?), it assumes a fatal error has occurred and terminates the job unless you have specified error recovery (refer to Section 2.4). If you wish Batch to recognize another character (in addition to the question mark) as the beginning of a fatal error message, you must specify the character in the .ERROR command. The character specified may not be a control character, an exclamation point (!) or a semicolon(;). The exclamation point is always interpreted as the

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comment character and will not function as the error-signal character. This command has the form:

```
.ERROR character
```

where

character is a single ASCII character

If you do not specify a character in the .ERROR command, Batch uses only the standard error character, the question mark. When a line that begins with the character you specify in the .ERROR command is output to the Batch job by the system, a system program, or is issued by Batch itself, Batch treats the line as a fatal error and terminates the job, exactly as it would if the line were preceded by a question mark. Any messages preceded by other characters will not be recognized by Batch as errors.

If you do not include the .ERROR command in your control file, Batch will recognize only the question mark as the beginning character of a fatal error message.

An example of the .ERROR command follows.

```
.  
.  
.  
.ERROR %  
.  
.  
.  
.ERROR
```

In this example, you specify in the middle of the control file that you want Batch to recognize the question mark (?) and the percent sign (%) as the beginning character of a fatal error from that point in the control file. Further on in the control file, you tell Batch to go back to recognizing only the question mark as the beginning of a fatal error message.

2.3.3 The .NOERROR Command

You can use the .NOERROR command to tell Batch to ignore all error messages issued by the system, system programs, and Batch itself. The .NOERROR command has the form:

```
.NOERROR
```

When Batch reads the .NOERROR command, it ignores any error messages that would normally cause it to terminate your job. The only exception is the message ?TIME LIMIT EXCEEDED. Batch will always recognize this as an error message, give you an extra 10% of your allotted time, and terminate your job.

You can use .NOERROR commands in conjunction with .ERROR commands in the control file to control error reporting. For example, if you wish to ignore errors at the beginning and end but not in the middle of the control file, place .ERROR and .NOERROR commands at the appropriate places in the control file. In addition, you can also specify which messages must be treated as fatal errors.

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```
.
.
.
.NOERROR
.
.
.ERROR %
.
.
.ERROR
.
.
.NOERROR
```

The first command tells Batch to ignore all errors in your job. The second command tells Batch to recognize as errors any message that starts with a question mark (?) or a percent sign (%). You change the error reporting with the next command to tell Batch to go back to recognizing only messages that begin with a question mark as fatal. The second .NOERROR command tells Batch to ignore all error messages again. If the ?TIME LIMIT EXCEEDED message is issued at any time, Batch will print the message, extend the time by 10%, and then terminate the job.

2.3.4 The .GOTO Command

You can include the .GOTO command in your control file to direct Batch to skip over lines in the control file to find a specific line. The .GOTO command has the form:

```
.GOTO label
```

where

label is a one- to six-character alphanumeric label for a statement. The line that contains the label must be followed by two colons (::).

An example of the .GOTO command follows.

```
.
.
.
.GOTO ABC
.
.
ABC::.DIRECT
```

You can use the .GOTO command as the statement in an .IF command (refer to Section 2.3.1) to aid you in error processing. For example:

```
.
.
.
.IF (ERROR) .GOTO ABC
.
.
ABC::.TYPE MYPROG
```

ENTERING A BATCH JOB FROM A TERMINAL

When Batch encounters a .GOTO command in the control file, it searches forward in the control file to find the label specified in the .GOTO command. Batch then resumes processing of the control file at the line which has the specified label. If the label is not found, Batch will issue the message

```
? BTNCNF Could not find label xxxxxx
```

and the job will be terminated.

If you do not include a .GOTO command in the control file, Batch reads the control file sequentially from the first statement to the last.

2.3.5 The .BACKTO Command

You can use the .BACKTO command to direct Batch to search back in the control file for a line with a specified label. The .BACKTO command has the form:

```
.BACKTO label
```

where

```
label      is a one- to six-character alphanumeric label for a
            statement. The line that contains the label must be
            followed by two colons (::).
```

An example of the .BACKTO command follows.

```
.
.
.
ABC::DIRECT
.
.
.BACKTO ABC
```

Normally, Batch reads the control file line by line and passes the commands and data to the system and your program. When you put a .BACKTO command into the control file, you tell Batch to interrupt the normal reading sequence and to search back in the control file to find a line containing the label specified in the .BACKTO command. The .BACKTO command searches for the label you specified, starting from the beginning of the file and ending at the place the command was given. When the labeled line is reached, Batch executes the line and continues from that point.

If Batch cannot find the labeled line, it terminates your job.

2.4 SPECIFYING ERROR RECOVERY IN THE CONTROL FILE

If you do not specify error recovery when an error occurs in your job, Batch terminates the job. You can specify error recovery in the control file by means of the Batch commands, especially the .IF Batch command. If you wish to recover from errors while the job is processing, you must put the .IF command at the point between programs in the control file where an error may occur. When an error occurs, Batch skips over all lines in the control file until it encounters a line beginning with a period (.). If this line contains an .IF

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command, the .IF command is processed and the job continues. If this line does not contain an .IF command, the job is terminated. Therefore, if a Batch job is to recover from an error successfully, the .IF command must be placed in the control file where the error is expected to occur but before any other commands preceded by the . character. Thus, if you have a program that you are not sure is error free, you can include an .IF command to tell Batch what to do if an error occurs, as shown in the following example.

```
.COMPILE MYPROG.FOR
.IF (ERROR) statement
.
.
.
```

In either the .IF (ERROR) or the .IF (NOERROR) command, you should include a statement that tells Batch what to do. You can use any monitor command or Batch command. The .GOTO and .BACKTO commands are also commonly used for this purpose. Refer to Sections 2.3.4 and 2.3.5 for descriptions of these commands. Be sure, if you use .GOTO or .BACKTO in the .IF command, that you supply a line in the control file that has the label that you specified in the .GOTO or .BACKTO command. If you wish to simply ignore the error without taking any special action, you may use a comment as the statement.

Two sample jobs are shown below. The first shows the .IF (ERROR) command and the .GOTO command to specify error recovery. The second example shows the use of the .IF (NOERROR) and .GOTO commands.

If you have a program that you are not sure will compile without errors, you can include another version of the same program in your job (that hopefully will compile) and tell Batch to compile the second program if the first has an error. You would write the control file as follows.

```

  SP
  ↓
.SOS MYFILE.CTL (RET)
INPUT: MYFILE.CTL
00100 .COMPILE /COMPILE MYPROG.FOR/LIST (RET)
00200 .IF (ERROR) .GOTO A (RET)
00300 .EXECUTE MYPROG.FOR (RET)
00400 .GOTO B (RET)
00500 A:!!CONTINUE (RET)
00600 .COMPILE /COMPILE PROG2.FOR/LIST (RET)
00700 .EXECUTE PROG2.FOR (RET)
00800 B:!!CONTINUE (RET)
00900 $
      ↑
      ESC
*E (RET)

[DISK:MYFILE.CTL]
```

When the job is run, Batch reads the control file and passes commands to the system. If an error occurs in the compilation of the first program, Batch finds the .IF (ERROR) command and executes the .GOTO command contained in it. The .GOTO command tells Batch to look for the line labeled A:.. Thus, Batch skips lines in the control file until it finds label A and then passes commands to the batch job from that point. If an error does not occur while compiling MYPROG, the .GOTO A statement is not executed. Instead, MYPROG is executed and then Batch skips to the line labeled B:..

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A variation of the above procedure is shown below using the .IF (NOERROR) command and the .GOTO command. The difference is that Batch skips the .IF (NOERROR) command if an error does occur, and performs it if an error does not occur. The following is the control file that you would create.

```

      SP
      ↓
.SOS MYFILE.CTL RET
INPUT: MYFILE.CTL
00100 .COMPILE /COMPILE MYPROG.FOR/LIST RET
00200 .IF (NOERROR) .GOTO A RET
00300 .COMPILE /COMPILE PROG2.FOR/LIST RET
00400 .EXECUTE FROG2.FOR RET
00500 .GOTO B RET
00600 A:!!CONTINUE RET
00700 .EXECUTE MYPROG.FOR RET
00800 B:!!CONTINUE RET
00900 $
      ↑
      ESC
*E RET

[DSKC:MYFILE.CTL]
.
```

When the job is run, Batch passes the COMPILE command to the system to compile the first program. If an error does not occur, the .IF (NOERROR) command and the .GOTO command are executed, Batch skips to the line labeled A, which is a comment, and passes commands to the Batch job from that point. The program MYPROG.FOR is executed and the end of the job is reached. If an error occurs while compiling MYPROG, Batch skips the .IF (NOERROR) command and continues reading the control file. PROG2.FOR is compiled and then executed. Batch is then told to go to the line labeled B, which is a comment line. The end of the job follows.

The examples shown above illustrate only two ways that you can use the .IF commands to specify error recovery in the control file. You can use any of the Batch commands or any system command that you wish to recover from errors in your job.

However, you do not have to attempt to recover from errors while your job is running. You can correct your errors according to the error messages in the log file when your job is returned to you, and then run your job again. The log file is described in Chapter 4.

CHAPTER 3

ENTERING A BATCH JOB FROM CARDS

When you enter a job to Batch from card input, you must create a control file on cards that is somewhat similar to a control file created on a timesharing terminal, but that contains some additional Batch commands. The card control file must tell Batch to start your job, the tasks or steps your job must take, and when to stop your Batch job. The tasks or steps in your Batch job can consist of calls to a system program, can create files on disk, and can recover from errors.

Your control card input to Batch may contain any combination of commands. These commands are in four groups as follows:

1. TOPS-10 system commands, which consist of commands in a format similar to what you would issue for the same command on a timesharing terminal. Examples of these commands are .COPY, .DISMOUNT, .PRINT, and .RENAME.
2. System program commands, which consist of commands that pertain to a system or user program. An example is the command to the FILCOM program to specify files to be compared.
3. Batch commands, as described in Chapter 2, Section 2.3.
4. Batch control card commands, some of which are listed below.

\$JOB	(See Section 3.2.1)
\$PASSWORD	(See Section 3.2.2)
\$EOJ	(See Section 3.2.3)
\$CREATE	(See Section 3.2.4)
\$-language	(See Section 3.2.5)
\$EXECUTE	(See Section 3.2.6)
\$DATA	(See Section 3.2.7)
\$EOD	(See Section 3.2.8)
\$TOPS10	(See Section 3.2.9)
\$ERROR	(See Section 3.2.10)
\$NOERROR	(See Section 3.2.10)

Not all of the available Batch control commands are listed above and described in Section 3.2. Refer to the DECsystem-10 (TOPS-10) Batch Reference Manual for a complete description of all available Batch control card commands.

ENTERING A BATCH JOB FROM CARDS

3.1 BATCH CONTROL CARD FORMAT CONVENTIONS

The Batch control cards must contain a dollar sign (\$) in column 1 and a command that starts in column 2. The command must be followed by at least one space, which can then be followed by other information. (Refer to the individual description of each card for more information about it.)

A card with a TOPS-10 system command must contain a period (.) in column 1 followed immediately by the command. Any information that follows the command is in the format shown for the command in the DECSYSTEM-10 (TOPS-10) Operating System Commands Manual. The \$TOPS10 Batch control card command must precede TOPS-10 system commands in your card deck. (Refer to Section 3.2.9 for the format and description of the \$TOPS10 card.)

A card with a command to a system program must contain an asterisk (*) in column 1 followed immediately by the command string.

Batch commands are formatted in the same manner as system commands; that is, a period (.) is punched in column 1 and the command immediately follows it. You must also place a \$TOPS10 card before Batch commands in the card deck to enable execution of these commands.

If you put any special characters other than those described above in the first column of a card, you may get unexpected results because Batch interprets other special characters in special ways.

If you have more information than will fit on one card, insert a hyphen (-) as the last nonspace character on the first card and continue the information on the second card.

Comments can also be included either on separate cards or on cards containing other information. If the entire card is to contain a comment, the card should contain a dollar sign (\$) in column 1 and an exclamation point (!) in column 2. The exclamation point (!) is called the comment character. If the card contains a command followed by a comment, only the exclamation point (!) should precede the comment. If the comment is too long to be contained on a single card, begin the next card with a dollar sign (\$) in column 1 and the exclamation point (!) in column 2 and then continue the comment. Refer to the manual that describes the program you are using, as some programs and their input do not accept comments preceded by the exclamation point (!).

3.2 BATCH CONTROL CARD COMMANDS

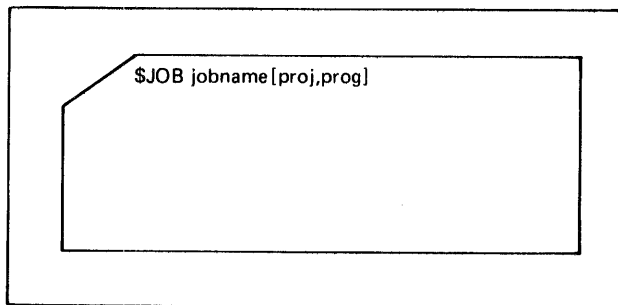
Eleven Batch control card commands are described in the following sections. Additional Batch control card commands are available and can be referred to in the DECSYSTEM-10 (TOPS-10) Batch Reference Manual.

3.2.1 Starting a Job - The \$JOB Card

The \$JOB card is the first card in your card deck. The \$JOB card tells Batch whose job it is processing and, optionally, the name of the job, and any constraints that you want to place on the job. When Batch reads the \$JOB card, it begins the log file for your job.

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The \$JOB card has the form:



[proj,prog] is the project-programmer number assigned to you by the installation to allow you to gain access to the DECsystem-10. The project-programmer number (PPN) must be enclosed in either square brackets ([]), parentheses (()), or angle brackets (< >). Square brackets can be obtained with a ¢ sign for the left bracket and a ! sign for the right bracket. Refer to Appendix B of the Hardware Reference Manual for a description of several kinds of keypunches.

/switches are optional switches to Batch to tell it the constraints that you have placed on your job. They are described below.

/AFTER:dd-mmm-yy hh:mm Switch

If you do not want Batch to run your job until after a certain time and/or a certain day, you can include the /AFTER switch on your \$JOB card. The date and time are specified in the form dd-mmm-yy hh:mm (e.g., 16-APR-78 17:15). If you omit this switch, Batch schedules your job as it normally does; that is, Batch schedules your job based on the time required and other parameters.

/AFTER:+hh:mm Switch

If you do not want Batch to run your job until after a certain amount of time has elapsed since the job was entered, include this form of the /AFTER switch on the \$JOB card. The amount of time that the job must wait after it has been entered is specified in the form +hh:mm (e.g., +1:30). If this switch is not included, Batch will schedule the job as it normally does.

/PAGES:n Switch

Normally, Batch allows your job to print up to 200 pages. Included in this number are the log file and any compilation listings that you may request. If you need more than 200 pages for your job, you must include the /PAGES switch on the \$JOB card to indicate the approximate number of pages that your job will print. If your output exceeds either the maximum that Batch allows or the number that you specified in the /PAGES switch, the excess output will not be printed and the

ENTERING A BATCH JOB FROM CARDS

message ?LPTPLE Page Limit Exceeded will be written in the log file. However, even if you exceed the maximum, the first 10 pages of the log file will be printed.

NOTE

Do not arbitrarily enter a large PAGES value as this may delay execution of your Batch job.

/TIME:hh:mm:ss Switch

Normally, Batch allows your job to use up to five minutes of central processor (CPU) time. CPU time is the amount of time that your job runs in memory, not the amount of time that it takes Batch to process your job. If you need more than five minutes of CPU time, you must include the /TIME switch on the \$JOB card to indicate the approximate amount of time that you will need. If you do not specify enough time, Batch will terminate your job when the time is up. However, if you specify a large amount of time, Batch may hold your job in the queue until it can schedule a large amount of time for it.

The value in the /TIME switch is given in the form hh:mm:ss (hours:minutes:seconds). If you specify only one number, Batch assumes that you mean seconds. Two numbers separated by a colon (:) are assumed to mean minutes and seconds. All three numbers separated by colons mean hours, minutes, and seconds. For example:

```
/TIME:25          means 25 seconds
/TIME:1:25       means 1 minute and 25 seconds
/TIME:1:25:00   means 1 hour, 25 minutes, and no seconds
```

The following rules apply to all switches in the above list that require a time and/or date to be specified:

When you specify the time of day (hh:mm:ss)

1. You must not omit the colon (:) or colons.

When you specify a date (dd-mmm-yy)

1. You must not omit the hyphens.
2. You must specify both the day and the month as a minimum requirement.
3. You can abbreviate the month to a minimum of three letters, e.g., JUL for July.
4. If you omit the year, the current year will be used.
5. If you omit the time from a date specification, the time is assumed to be midnight on the specified date. In the example below a current date and time of 20 April, 1978, 10AM will be assumed.

```
/AFTER:18:00      means 6 P.M. on April 20, 1978
/AFTER:3-May     means midnight on May 3, 1978
/AFTER:19-Apr 20:00 means 8 P.M on April 19, 1978
```

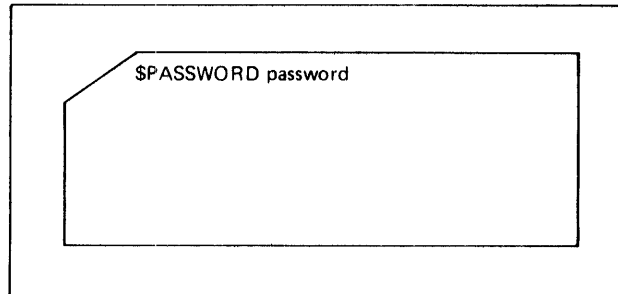
ENTERING A BATCH JOB FROM CARDS

3.2.2 Identifying Yourself - The \$PASSWORD Card

You put the password that has been assigned to you on the \$PASSWORD card to tell Batch that you are an authorized user of the system.

In conjunction with the \$JOB card, the \$PASSWORD card identifies you to Batch and tells Batch to process your job. If you put a password on the \$PASSWORD card that does not match the password stored in the system for you, Batch will terminate your job. The \$PASSWORD card must be present and must immediately follow the \$JOB card.

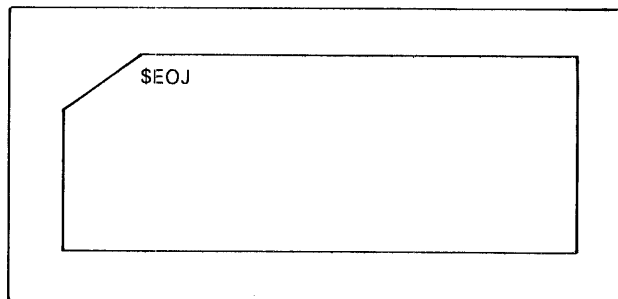
The \$PASSWORD card has the form:



password is a 1- to 6-character password that is stored in the system to identify you. There must be exactly one space between the end of the card name (\$PASSWORD) and the first character of your password.

3.2.3 Ending a Job - The \$EOJ Card

You must put the \$EOJ card at the end of the deck containing your complete job to tell Batch that it has reached the end of your job. If you omit the \$EOJ card, an error message will be issued. However, your job will still be scheduled and may be processed if another job follows it. The form of the \$EOJ card is shown below.

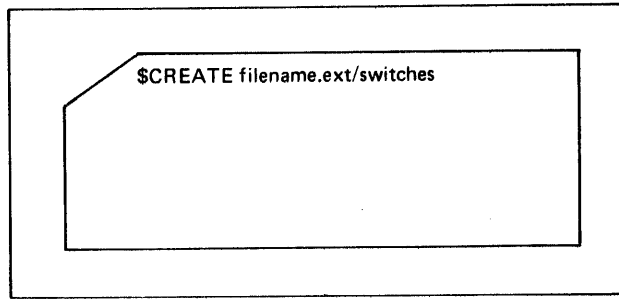


3.2.4 Creating a File - The \$CREATE Card

You can put the \$CREATE card in front of any program, data, or other set of information to make Batch copy the program, data, or information into a disk file. If the appropriate switch is included, Batch will also print this file on the line printer.

ENTERING A BATCH JOB FROM CARDS

The form of the \$CREATE card is:



`filename.ext` specifies the optional filename and file extension you want Batch to put on the file it creates for your program or data. If you omit the filename and extension, Batch will create a unique name for your file of the form CRxxxx, where xxxx represents a unique name generated by Batch.

`/switches` are switches to Batch to tell it how to read the cards in your deck. The switches are described below.

`/WIDTH:n` Switch

Normally, Batch reads 80 columns on every card in your deck. You can make Batch stop reading at a specific column by means of the `/WIDTH` switch, where you indicate the number of the column at which to stop. Thus, if you have no information in the last 10 columns of each card in your deck, you can tell Batch to read only up to column 70 by specifying

`/WIDTH:70`

`/SUPPRESS` Switch

When Batch reads the cards in your deck, it normally copies everything on the card up to column 80 (or up to any column you may specify with the `/WIDTH` switch). However, if you do not want trailing spaces copied (to save space on the disk, for example), you can tell Batch, by means of the `/SUPPRESS` switch, not to copy any trailing spaces into the disk file.

`/PRINT` Switch

The file currently being created on disk by Batch is listed on the line printer.

ENTERING A BATCH JOB FROM CARDS

Examples

The simplest form of the \$CREATE card is:

```
$CREATE
```

This card causes Batch to copy your deck into a disk file and to assign a unique name to it. All 80 columns of the cards are read and trailing spaces are copied into the file. The file is not printed.

The following is an example of a \$CREATE card.

```
$CREATE MYFILE.CDS/WIDTH:50/PRINT
```

The deck that follows this card is copied into a disk file named MYFILE.CDS. When Batch reads the cards in the deck, it copies trailing spaces into the file, reading up to 50 columns. The disk file created from your cards will be printed on the line printer.

3.2.5 Compiling a Program - The \$-language Card

The \$-language card specifies the source program language of your program on cards. It is placed in front of your program. The \$-language card may be any of the following:

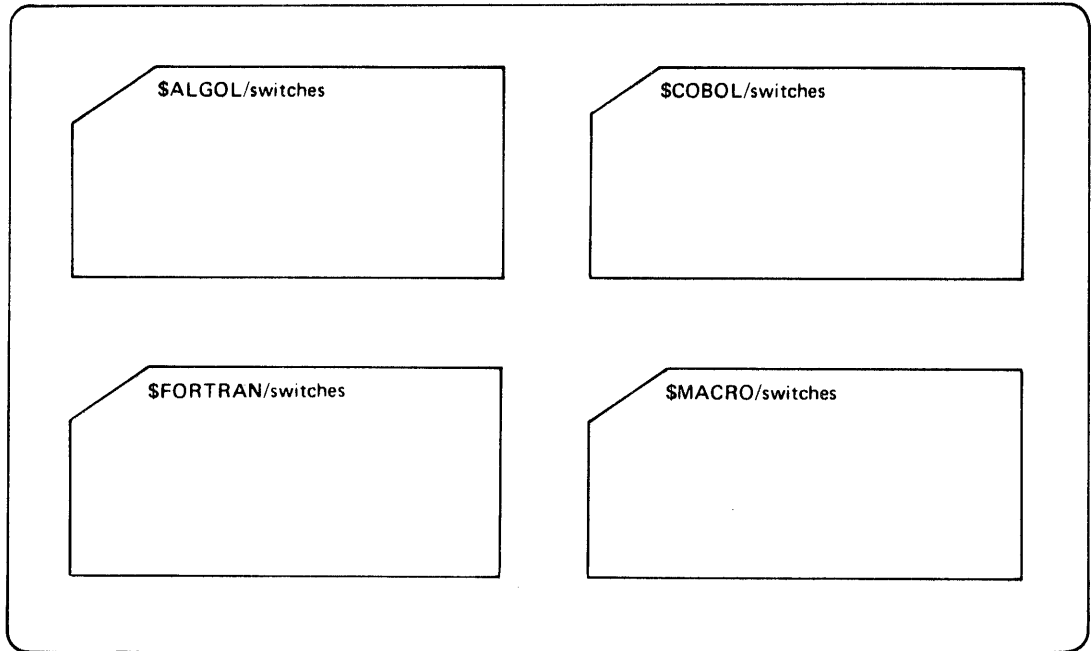
1. \$COBOL
2. \$FORTRAN
3. \$MACRO
4. \$ALGOL

The \$-language card causes Batch to copy your source program into a disk file and compile it. You may then execute your program by using the \$EXECUTE card (Section 3.2.6) or the \$DATA card (Section 3.2.7). Optional information (/switches) may be included on the \$-language card to tell Batch how to read and compile your program.

When Batch copies your source program file onto disk, Batch assigns a unique filename for your program in the form of LNxxxx. Depending on the type of \$-language card, the appropriate file extension is also assigned to this file. When your Batch job completes, the LNxxxx file is deleted automatically.

ENTERING A BATCH JOB FROM CARDS

The \$-language card has any of the following forms:



`/switches` are switches to Batch to tell it how to read your program and whether or not to request a compilation listing when the program is compiled. The switches can be put on the card in any order. The following three switches may be used with any of the \$-language cards. Additional switches are available and can be referenced in the DECsystem-10 (TOPS-10) Batch Reference Manual.

`/WIDTH:n` Switch

Normally, Batch reads up to 80 columns on every card of the source program. You can make Batch stop reading at a specific column by means of the `/WIDTH` switch. You indicate the number of a column at which to stop. Thus, if you have no useful information in the last 10 columns of each card of your program, you can tell Batch to read only up to column 70 by specifying

`/WIDTH:70`

`/NOLIST` Switch

Normally, the \$-language card tells Batch to ask the compiler to generate a compilation listing of your source program. The listing is then printed as part of your job's output. If you do not want this listing, you can include the `/NOLIST` switch on the \$-language card to stop generation of the listing.

ENTERING A BATCH JOB FROM CARDS

/SUPPRESS Switch

When Batch reads the cards of your source program it normally copies everything on the card up to column 80 or any column you may specify with the /WIDTH switch. However, if you do not want trailing spaces copied (to save space on the disk, for example), you can tell Batch, by means of the /SUPPRESS switch, not to copy any trailing spaces into the disk file.

Examples

The simplest form of the \$-language card is shown in the following example using ALGOL.

```
$ALGOL
```

This card causes Batch to copy your ALGOL card program into a disk file. The cards in the program are read up to column 80 and trailing spaces are not suppressed. A listing file is produced when the program is compiled. The listing is written as part of the job's output.

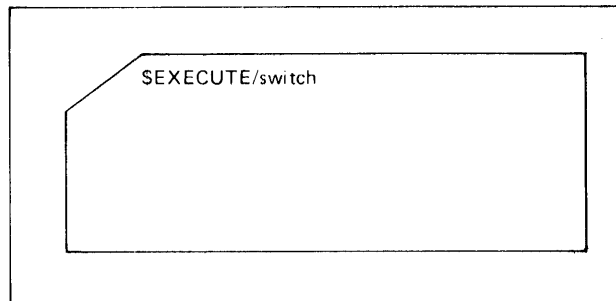
The following is an example of a \$ALGOL card with switches.

```
$ALGOL/NOLIST/SUPPRESS/WIDTH:72
```

With this card, Batch copies your program onto disk and inserts a COMPILE command into the control file. When the program is compiled, no listing is produced. The cards in the program are read up to column 72, and trailing spaces up to column 72 are not copied into the file.

3.2.6 Executing a Program - The \$EXECUTE Card

The \$EXECUTE card is used to execute the program that has been compiled using the \$-language card. This card is used when the program requires no data or uses data already existing on disk. The form of the \$EXECUTE card is shown below.



/switch is a switch to Batch to tell it what to include in the command it inserts in the control file.

ENTERING A BATCH JOB FROM CARDS

/MAP Switch

If you want a loader map to be generated and printed for you when your program is run, you can specify the /MAP switch on the \$EXECUTE card to tell Batch to request one for you.

An \$EXECUTE card following another \$EXECUTE card in the control file without any intervening \$-language cards causes the program executed by the first EXECUTE card to be loaded and executed again.

3.2.7 Executing a Program with Data - The \$DATA Card

The \$DATA card is used when you want to execute a program that uses data from cards. The \$DATA card must be in front of the input data cards. When Batch reads the \$DATA card, Batch copies the data cards that follow it onto a spooled card-reader file and then inserts an EXECUTE command into your control file to execute your program.

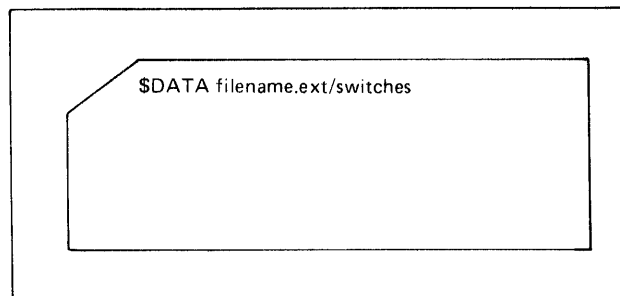
When your job is run, any programs are executed which were entered with \$-language cards that came before the \$DATA card. The spooled card reader file becomes the input to the currently executing program, and your program may reference this file by using the card reader as the input device.

If your input control file contains more than one program and input data, Batch will execute the first program with the input data, spool the results to be printed, and then compile the second program when Batch reads the second \$-language card. Again, when Batch reads the second \$DATA card, a spooled card-reader file is created for your input data cards and an EXECUTE command is inserted in your control file.

A \$DATA card (with its associated card deck) followed by another \$DATA card (with its deck), without intervening \$-language cards, causes the program to be loaded and executed twice. The first deck is used as data on the first execution and the second deck is used as data on the second execution.

If your data is included in the program or is already on disk (so that you do not have cards with data on them), use the \$EXECUTE card (Section 3.2.6) to execute the program.

The form of the \$DATA card is:



ENTERING A BATCH JOB FROM CARDS

`filename.ext` specifies an optional filename and file extension for the input data file (see Section 3.2.7.1). If omitted, a spooled card-reader file is created. You may reference this file by using the card reader as the input device in the source program. If included, a disk file is created, and you may reference this file by using the disk as the input device.

`/switches` are switches to Batch to tell it how to read your data cards. The switches are described below.

`/WIDTH:n` Switch

Normally, Batch reads up to 80 columns on every card of your data. You can make Batch stop reading at a specific column by means of the `/WIDTH` switch, where you indicate the number of a column at which to stop. Thus, if you have no useful information in the last 10 columns of each card of your data, you can tell Batch to read only up to column 70 by specifying

```
/WIDTH:70
```

`/SUPPRESS` Switch

When Batch reads the cards of your data, it normally copies everything on the card up to column 80 or up to any column you may specify with the `/WIDTH` switch. However, if you do not want trailing spaces copied (to save space on the disk, for example), you can tell Batch, by means of the `/SUPPRESS` switch, not to copy any trailing spaces into the disk file.

`/MAP` Switch

If you want a loader map to be generated and printed for you when your program is run, you can specify the `/MAP` switch on the `$DATA` card to tell Batch to request one for you.

Examples

The simplest form of the `$DATA` card is:

```
$DATA
```

This card causes Batch to copy your data into a spooled card-reader file. A spooled card-reader file is a file that Batch creates on disk so that, when your program reads from the card reader, that file is read. All 80 columns of the cards are read and trailing spaces are copied into the file.

The following example shows a `$DATA` card with switches.

```
$DATA MYDAT.DAT/WIDTH:72
```

ENTERING A BATCH JOB FROM CARDS

The data that follows this card is copied into a file named MYDAT.DAT and an EXECUTE command is inserted into the control file. When Batch reads the cards of the data, it reads only up to column 72 and copies trailing spaces into the data file. To use the data in this file, your program should reference file MYDAT.DAT on the disk.

3.2.7.1 Reading from a Spooled Card-Reader File - If you let Batch assign a name to your data file, you will not know the name that your data file will have; you should, therefore, assign your data file, without a name, to the card reader. The following examples illustrate how to do this.

NOTE

The \$DATA card can be used for data of programs written in ALGOL, COBOL, FORTRAN, and MACRO. It can also be used for programs that are in relocatable binary form. However, data for BASIC programs cannot be copied by means of the \$DATA card because BASIC programs are not compiled and executed. For BASIC programs, use the \$CREATE card as described in Section 3.2.4.

COBOL Example

```
.  
. .  
ENVIRONMENT DIVISION.  
INPUT-OUTPUT SECTION.  
SELECT SALES, ASSIGN TO CDR.
```

```
.  
. .  
DATA DIVISION.  
FILE SECTION.  
FD SALES, LABEL RECORDS ARE OMITTED.
```

```
.  
. .  
$DATA (in the control file)
```

ENTERING A BATCH JOB FROM CARDS

FORTRAN Example

To read your data from the card reader, you use the unit number 2 or no unit number, as shown below.

```
$FORTRAN
```

```
.
```

```
.
```

```
.
```

```
READ (2,f), list
```

```
.
```

```
.
```

```
.
```

```
END  
$DATA
```

```
.
```

```
.
```

```
.
```

```
$FORTRAN
```

```
.
```

```
.
```

```
.
```

```
READ f, list
```

```
.
```

```
.
```

```
.
```

```
END  
$DATA
```

```
.
```

```
.
```

```
.
```

ENTERING A BATCH JOB FROM CARDS

ALGOL Example

In an ALGOL program, you assign the desired channel (signified by c) to the card reader and select the desired channel. Do not explicitly open the named file on the channel because the file does not have a name that is known to you.

```
.  
. .  
INPUT (c, "CDR")  
SELECT INPUT (c)
```

```
.  
. .  
$DATA
```

3.2.7.2 Naming Data Files on the \$DATA Card - If you want to name your data file on the \$DATA card rather than letting Batch name it for you, you must, in your program, assign that file to disk as shown in the following examples.

COBOL Example

```
.  
. .  
ENVIRONMENT DIVISION.  
INPUT-OUTPUT SECTION.  
SELECT SALES, ASSIGN TO DSK.
```

```
.  
. .  
DATA DIVISION.  
FILE SECTION.  
FD SALES, VALUE OF IDENTIFICATION IS "SALES CDS".
```

The \$DATA card would then appear as follows.

```
$DATA SALES.CDS
```


ENTERING A BATCH JOB FROM CARDS

FORTRAN Examples

You can assign your data to disk in several ways when you use FORTRAN. You can read from unit 1, which is the disk, in your program and use the name FOR01.DAT as the filename on your \$DATA card, as shown in the following statements.

```
.  
.  
.  
READ (1,f), list  
.  
.
```

```
.  
$DATA FOR01.DAT
```

You can also tell FORTRAN to read from logical unit 2, which is normally the card reader, and assign unit 2 or the card reader (CDR) to disk (DSK). You can use the name FOR02.DAT on the \$DATA card in this case.

```
.  
.  
OPEN (UNIT=2,DEVICE='DSK')  
READ (2,f), list  
.  
.
```

```
.  
$TOPS10  
.ASSIGN DSK CDR  
$DATA FOR02.DAT
```

ALGOL Example

To read your data from the disk in an ALGOL program, you would use the following statements. You can assign your data to any channel (signified by c) and you can give your data file any name as long as the name that you use in your program is the same as that put on the \$DATA card.

ENTERING A BATCH JOB FROM CARDS

```
.  
. .  
INPUT (c, "DSK")  
SELECT INPUT (c)  
OPENFILE (c, "MYDAT.DAT")  
. .  
. .
```

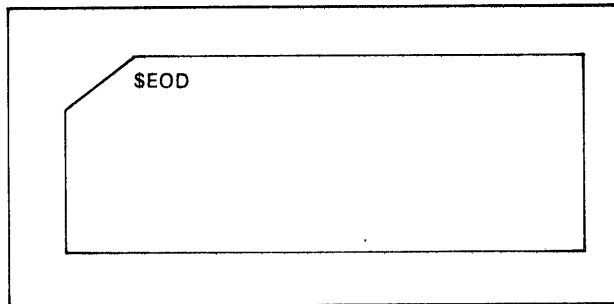
```
.$DATA MYDAT.DAT
```

This is done to ensure that your program finds your data in the disk file under the name that you have assigned to it.

3.2.8 End of Data Input - The \$EOD Card

The \$EOD card terminates the card input that was preceded by a \$CREATE, \$DATA, or \$-language card.

The form of the \$EOD card is:



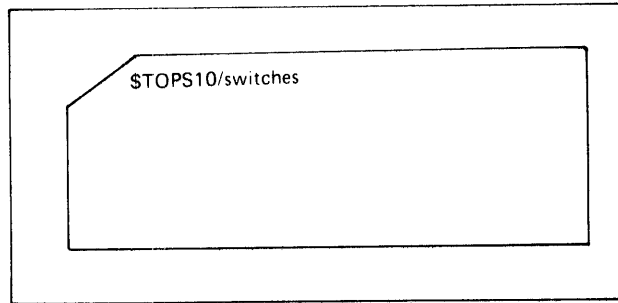
If the \$EOD card does not follow the card input, Batch recognizes the next card with a dollar sign (\$) in column one as a new Batch command and as the end of the card input; that is, an EOD card is assumed if one is not present.

3.2.9 System Commands - The \$TOPS10 Card

You can include system commands, commands to system or user programs, and Batch commands in your deck by inserting a \$TOPS10 card immediately before these commands. The \$TOPS10 card directs Batch to copy all cards following it into the Batch control file. Therefore, a single system command or Batch command or a group of consecutive system and/or Batch commands must be preceded by a \$TOPS10 card. The copying process is terminated by the next control card in the deck.

ENTERING A BATCH JOB FROM CARDS

The form of the \$TOPS10 card is:



`/switches` are switches to Batch to tell it how to read and interpret your input.

`/WIDTH:n` Switch

Normally, Batch reads up to 80 columns on every card of your system or Batch commands. You can make Batch stop reading at a specific column by using the `/WIDTH` switch, where you indicate the column number at which Batch is to stop reading. Thus, if you have no useful information in the last 10 columns of each card, you can tell Batch to read only up to column 70 by specifying

`/WIDTH:70`

`/SUPPRESS` Switch

When Batch reads your cards, it normally copies everything on the card up to column 80 or up to any column you may specify with the `/WIDTH` switch. However, if you do not want trailing spaces copied (to save space on the disk, for example), you can tell Batch, by means of the `/SUPPRESS` switch, not to copy any trailing spaces into the disk file.

Figure 3-1 illustrates a sample Batch input card deck using only TOPS-10 commands.

ENTERING A BATCH JOB FROM CARDS

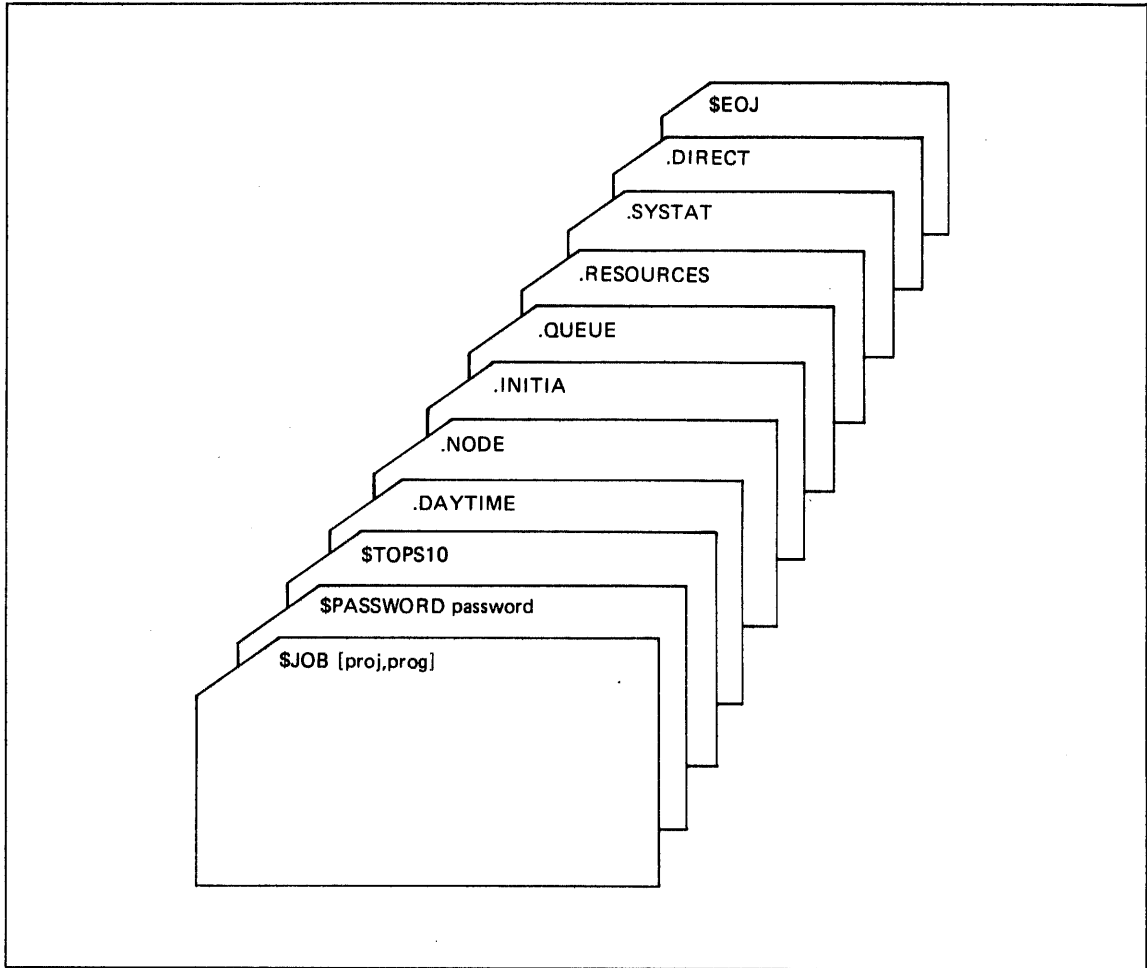


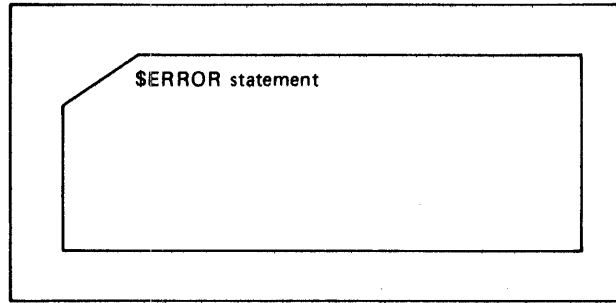
Figure 3-1 Batch Card Deck Using TOPS-10 Commands

3.2.10 Error Recovery - The \$ERROR and \$NOERROR Cards

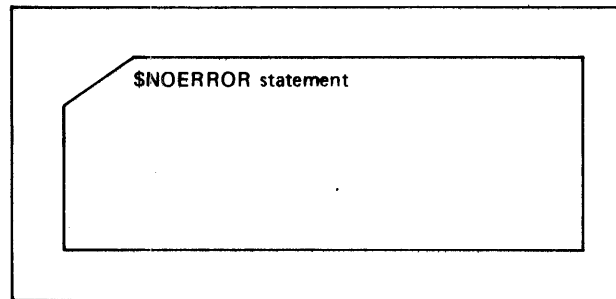
You can use the \$ERROR card and the \$NOERROR card to recover from errors that may occur while your Batch job is running. If an error occurs during your job (for example, a program fails to compile), Batch will normally terminate your job. However, if a \$ERROR or \$NOERROR card is included in your card deck immediately after the point at which the error occurs, Batch will proceed as indicated on the \$ERROR or \$NOERROR card and will not terminate the job.

ENTERING A BATCH JOB FROM CARDS

The \$ERROR card has the form:



The \$NOERROR card has the form:



statement is a system command or a special Batch command (for example, .GOTO or .BACKTO) such as you would include following a \$TOPS10 card. The Batch commands are described in Section 2.3. The statement may also be a comment (begun with the exclamation point(!)) if you wish Batch to simply ignore the error.

If an error occurs in your Batch job and the \$ERROR card is then encountered, the statement on the \$ERROR card is executed and the job continues. If the \$ERROR card is encountered when an error has not occurred, the card is ignored.

If an error occurs in your Batch job and the \$NOERROR card is encountered, no action will be taken, with the exception that Batch will not terminate your job as it would have if the card had not been found. If the \$NOERROR card is encountered when no error has occurred, the statement on the \$NOERROR card is executed.

The \$ERROR card is equivalent to the Batch command .IF(ERROR). The \$NOERROR card is equivalent to the Batch command .IF(NOERROR). See Section 3.5 for examples of Batch jobs using the \$ERROR and \$NOERROR cards.

ENTERING A BATCH JOB FROM CARDS

3.3 SETTING UP YOUR CARD DECK

Batch enters commands into the control file when you use certain control cards. Where you put these control cards in your card deck determines their position in the control file. Batch reads your card deck in sequential order, copying commands into the control file as they or the special control cards are read. However, when Batch reads a control card that tells it to copy a program or data into a disk file, the disk file is created immediately, before the remainder of the job is processed. Every succeeding card is copied until another control card is read.

A Batch job can do almost anything a timesharing job can do. If you wish to perform complicated tasks, you may include system commands in your deck to direct Batch to execute these tasks. Section 3.4 describes the way to include system commands for the desired control.

The \$JOB card, the \$PASSWORD card, and the \$EOJ card are required for all jobs. The \$JOB card must be the first card in the deck and must be immediately followed by the \$PASSWORD card. The \$EOJ card must be the last card in the deck.

The control cards used to compile and execute programs written in ALGOL, COBOL, FORTRAN, and MACRO are shown in Figure 3-2. The following card deck does not apply to control card decks for BASIC. Refer to Section 3.4.1 for information regarding BASIC.

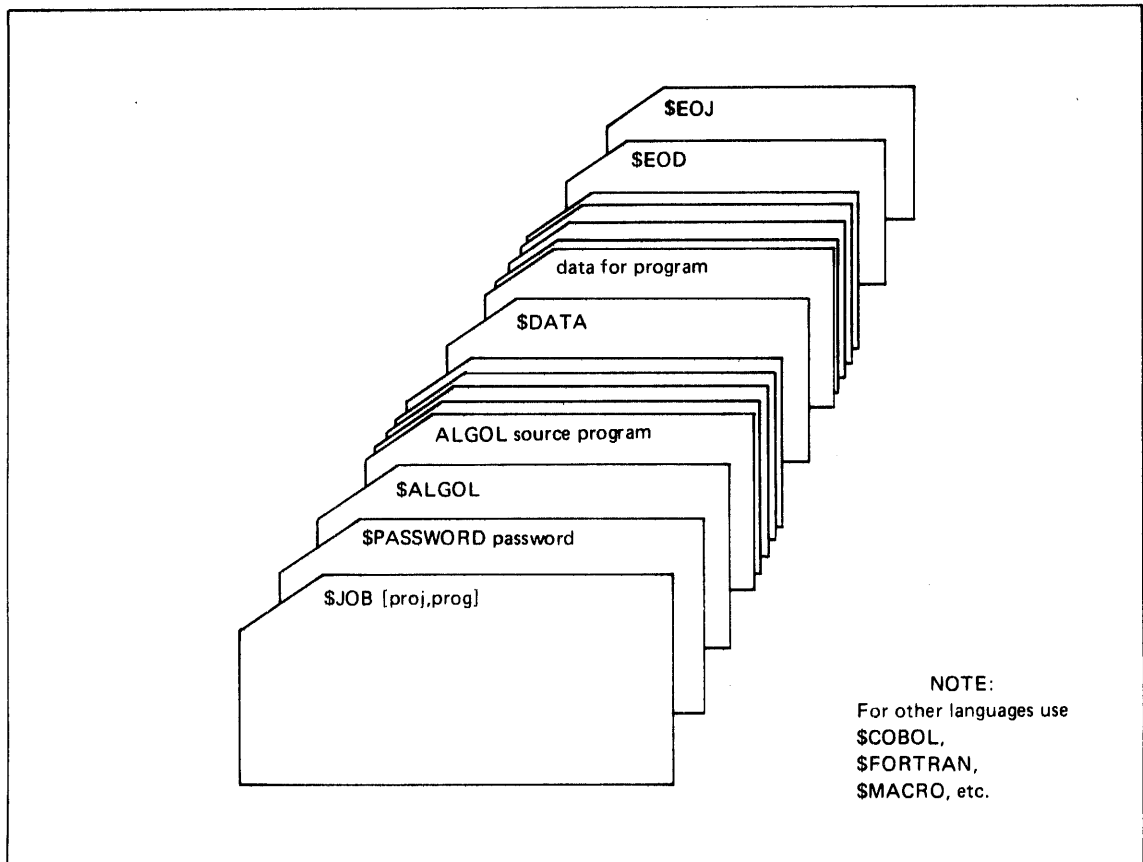


Figure 3-2 Typical Program Card Deck

ENTERING A BATCH JOB FROM CARDS

The typical card deck shown in Figure 3-2 includes a language card (\$ALGOL, \$COBOL, etc.) immediately prior to the source program. This language card informs Batch of the system program to be employed for processing (compiling) the succeeding cards. The \$DATA card likewise immediately precedes the data cards to inform Batch that the succeeding cards contain data for the program. The program is stored on disk as a disk file. The input data is stored on a spooled card-reader file. The \$DATA card causes Batch to execute the program, using the data cards as input. The \$EOJ card informs Batch that all cards pertaining to the job have been entered. At this time Batch has access to the program to be compiled and the data to be used by the program; it knows what compiler or assembler is to be used, and has built a control file containing the EXECUTE command so that the program will be run.

3.4 PUTTING COMMANDS INTO THE CONTROL FILE FROM CARDS

Batch enters commands into the control file when you use certain control cards such as \$EXECUTE and \$DATA. However, only a small number of operations, such as compilation and execution of programs, can be put into the control file using control cards. To perform operations in your control file other than compilation or execution, you must include commands in your card deck for Batch to copy into your control file. If you want to include Batch commands or system commands in your card deck, you must insert a \$TOPS10 card immediately before these commands in your deck. The \$TOPS10 card directs Batch to copy all succeeding commands into the control file until the next control card is encountered. The commands will later be executed by Batch in the same order that they appear in your card deck.

For example, in order to compare two card decks and produce a list of the differences, you could include the cards shown in Figure 3-3 in your deck.

ENTERING A BATCH JOB FROM CARDS

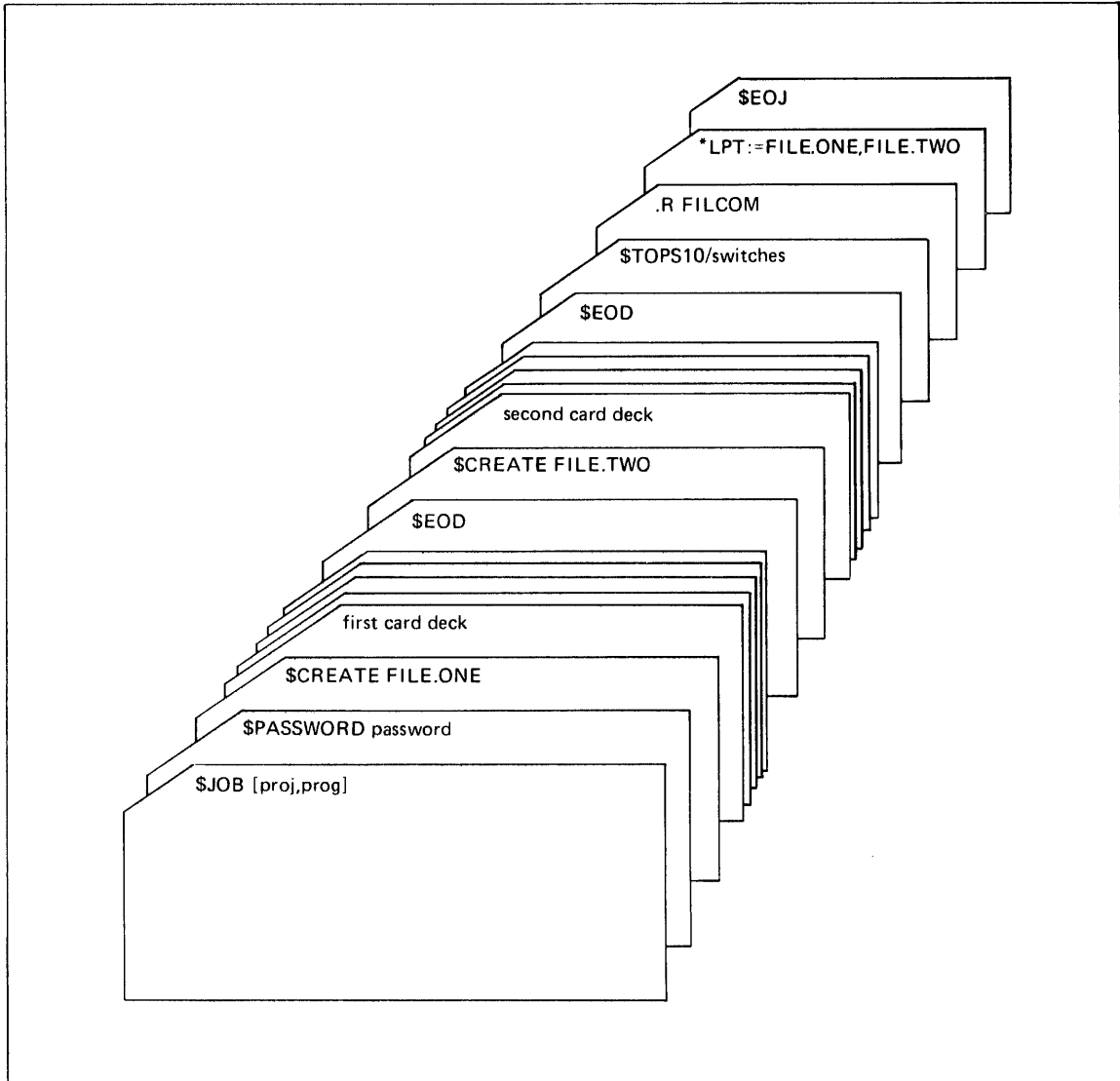


Figure 3-3 Use of Control Cards to Compare Two Card Decks

The only system commands that you cannot use in a Batch job are ATTACH and SET TIME. Batch will send these commands to the monitor, the monitor will give an error, and Batch will detect the error and terminate your job. Also, you should not use the LOGIN command in your Batch job because you will get an error. Batch logs in your job in accordance with your \$JOB and \$PASSWORD cards.

ENTERING A BATCH JOB FROM CARDS

3.4.1 Card Decks for Programs that Do Not Have Special Control Cards

By using system commands and the \$CREATE control card, you can process any program that does not have special control cards. You put a \$CREATE card in front of a program, data, or any other group of cards to make Batch copy the cards into a disk file and, if you request, to print the file on the line printer. The \$CREATE card is described in detail in Section 3.2.4. You put the \$TOPS10 card in front of monitor and Batch commands to cause Batch to copy these commands into the control file. The \$TOPS10 card is described in detail in Section 3.2.9.

For example, a BASIC program does not have a specific control card. To run a BASIC program under Batch from cards, you can combine the \$CREATE card and the \$TOPS10 card with system commands. You can also use a \$CREATE card to copy the data which a BASIC program will use. The \$DATA card cannot be used, because the \$DATA card puts an EXECUTE command into the control file, and BASIC does not use the EXECUTE command to run. The \$TOPS10 card causes Batch to copy the monitor commands into the control file.

Figure 3-4 shows a card deck that enters a BASIC program for running under Batch.

ENTERING A BATCH JOB FROM CARDS

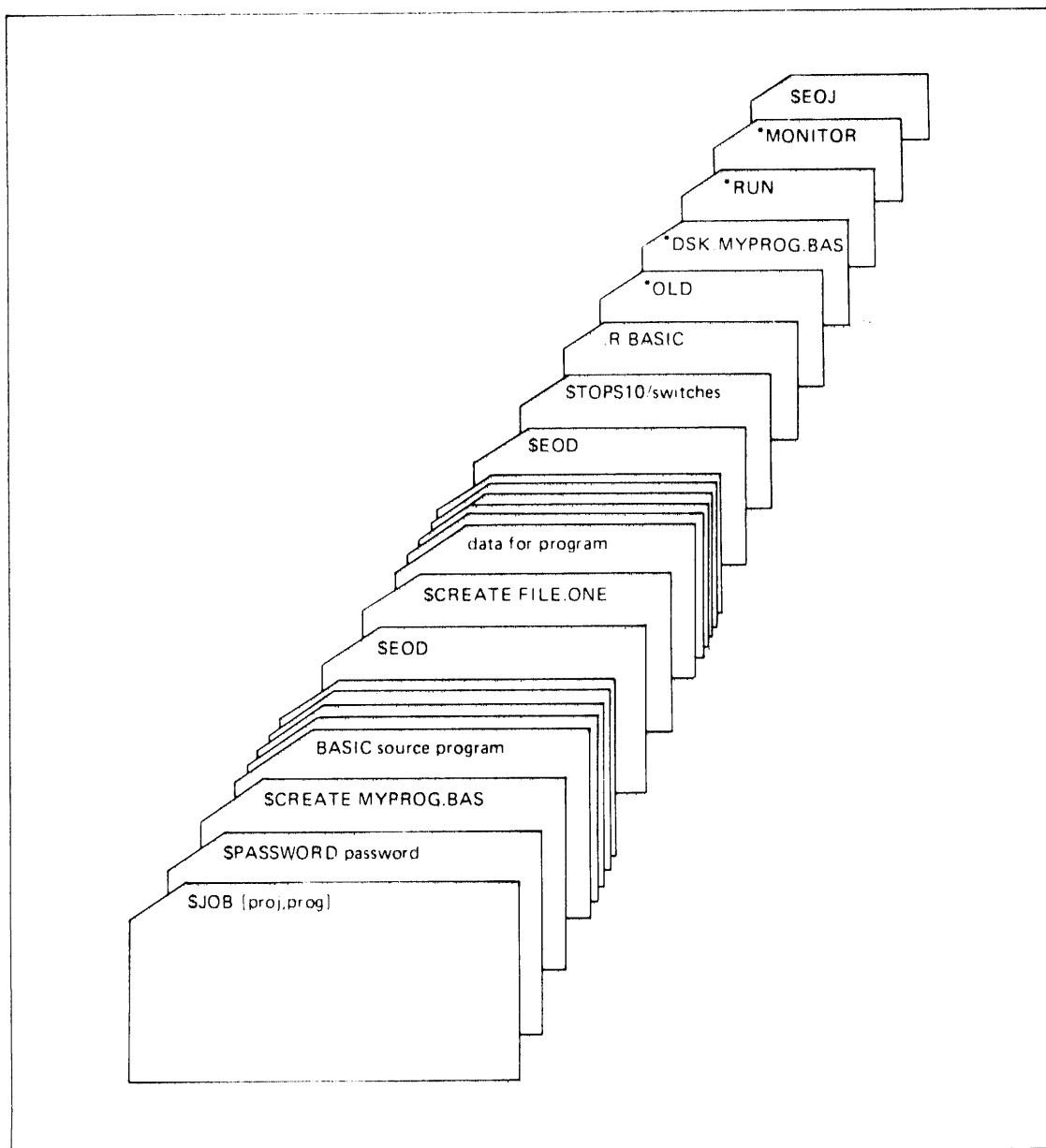


Figure 3-4 BASIC Program Card Deck with Integral Data

This BASIC program contains statements that read data from disk file FILE.ONE. You answer OLD to the BASIC question

NEW OR OLD-

because the program file is on disk and can be retrieved by BASIC.

If your BASIC program reads data that is to be input from a terminal during the running of the program, enter the data in the control file so that it will be passed to your program by Batch. This is shown in Figure 3-5.

ENTERING A BATCH JOB FROM CARDS

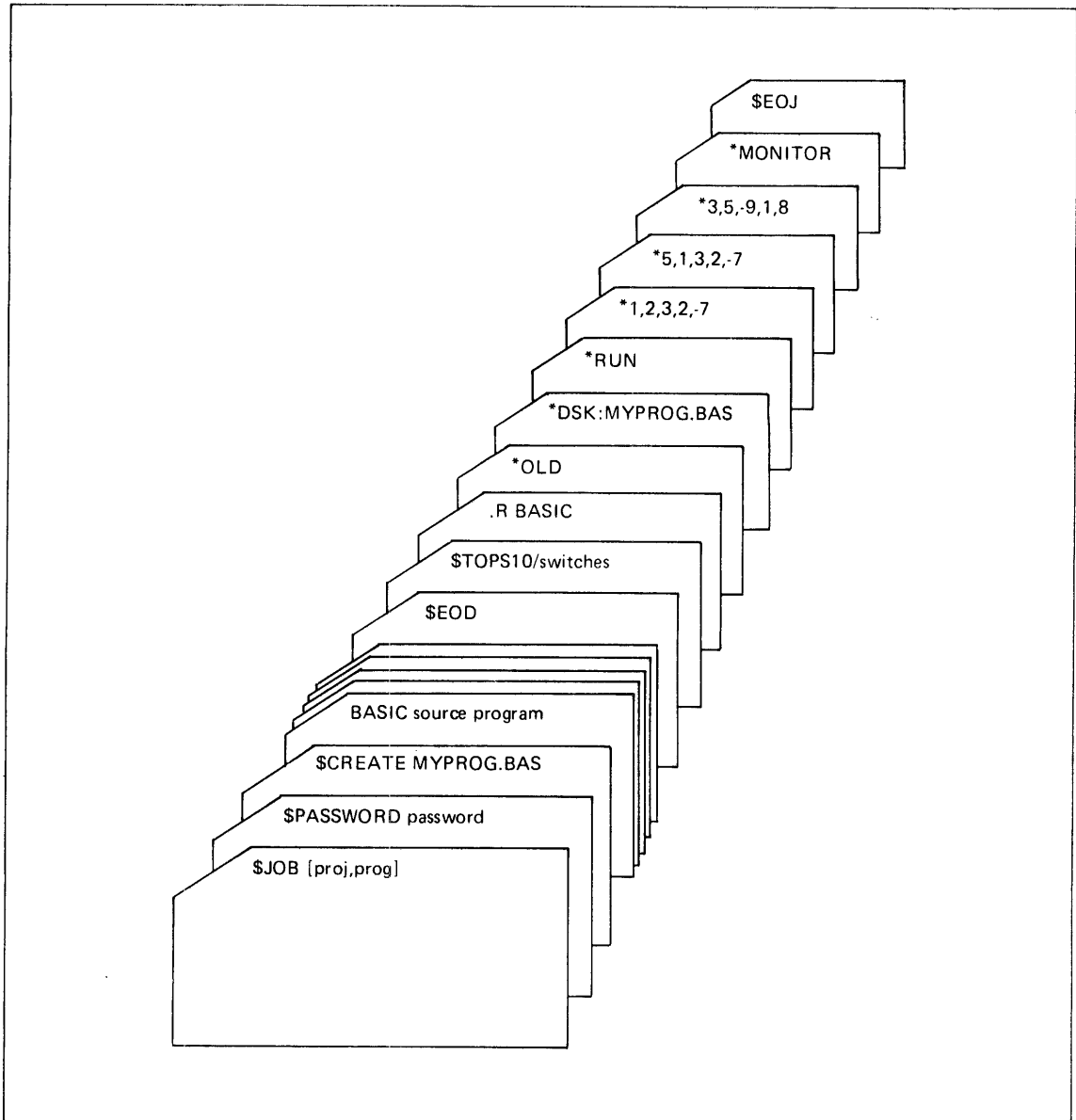


Figure 3-5 BASIC Program Card Deck with Provisions for Terminal Data Input

You can use the same technique to enter programs written in any language that does not have a specific control card provided that your installation supports the language. Also, you can run system programs under Batch using the same technique.

ENTERING A BATCH JOB FROM CARDS

3.5 SPECIFYING ERROR RECOVERY IN THE CONTROL FILE

Normally, when an error occurs in your job, Batch terminates the job. However, you can specify recovery from errors in the control file by means of the \$ERROR and \$NOERROR cards, described in Section 3.2.10. You must include one of these cards at the point in the control file where an error may occur. When an error occurs, Batch examines the next system command level line (skipping over lines that contain data or command strings of a system program) to find an .IF (ERROR) statement or .IF(NOERROR) statement to tell it what to do about the error. If an error does not occur and an .IF (ERROR) statement is present, the .IF (ERROR) statement is ignored. If an error occurs and an .IF(NOERROR) statement is present, the statement is ignored with the exception that Batch does not terminate the job.

Thus, if you have a program that you are not sure is error free, you can include a \$ERROR or \$NOERROR card to tell Batch what to do if an error occurs, as shown in Figure 3-6.

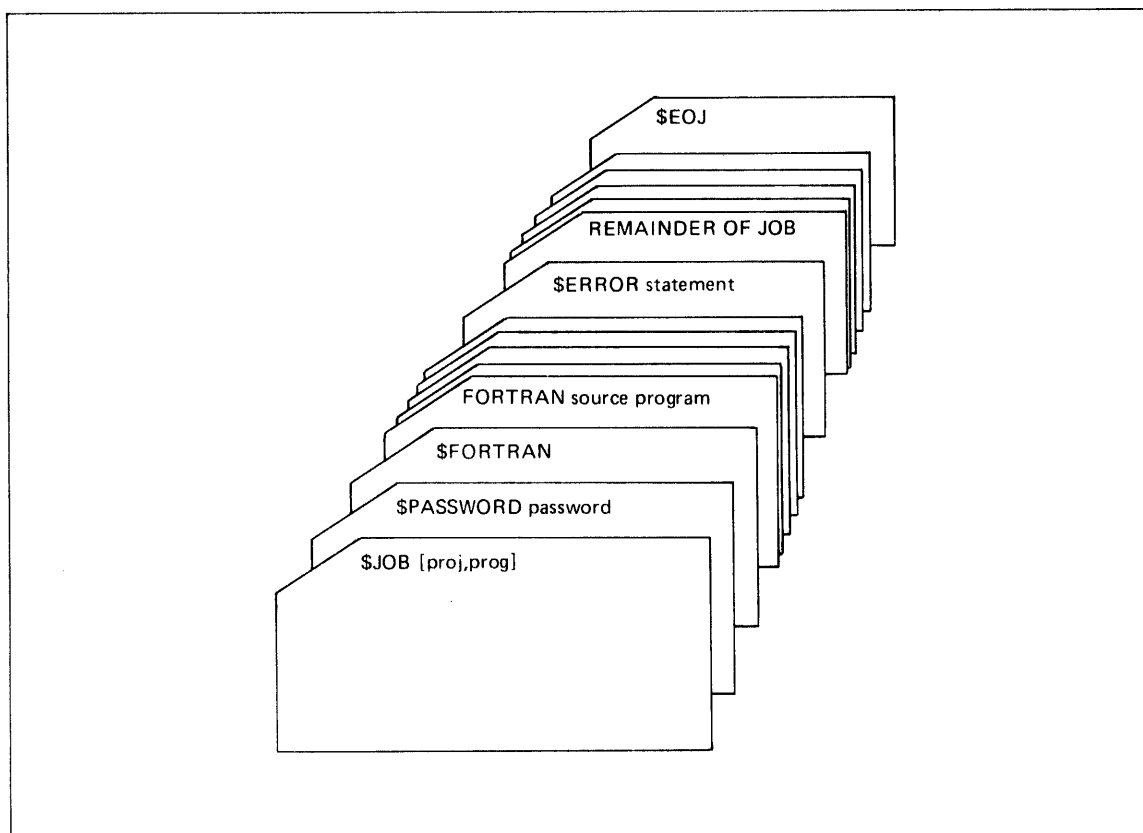


Figure 3-6 Card Deck with Error Statement

ENTERING A BATCH JOB FROM CARDS

The above cards would cause Batch to make the following entries in the control file.

```
.COMPIL . . .  
.IF (ERROR) statement
```

On either the \$ERROR or \$NOERROR card, you must include a statement that tells Batch what to do. You can use any system command, a command to a program, or one of the special Batch commands. The .GOTO and .BACKTO Batch commands are commonly used for this purpose. Refer to Sections 2.3.4 and 2.3.5 for descriptions of these commands. If you use .GOTO or .BACKTO on your \$ERROR or \$NOERROR card, be sure that you supply a line for the control file that has the label you specified in the .GOTO or .BACKTO command.

Two sample jobs are shown on the following pages. The first shows the use of the \$ERROR card and the .GOTO command to specify error recovery. The second example shows the use of the \$NOERROR card and the .GOTO command.

If you have a program that may compile with errors, you can include another version of the same program in your job (that hopefully will compile) and tell Batch to compile the second program if the first has an error. The cards to enter this job are shown in Figure 3-7.

ENTERING A BATCH JOB FROM CARDS

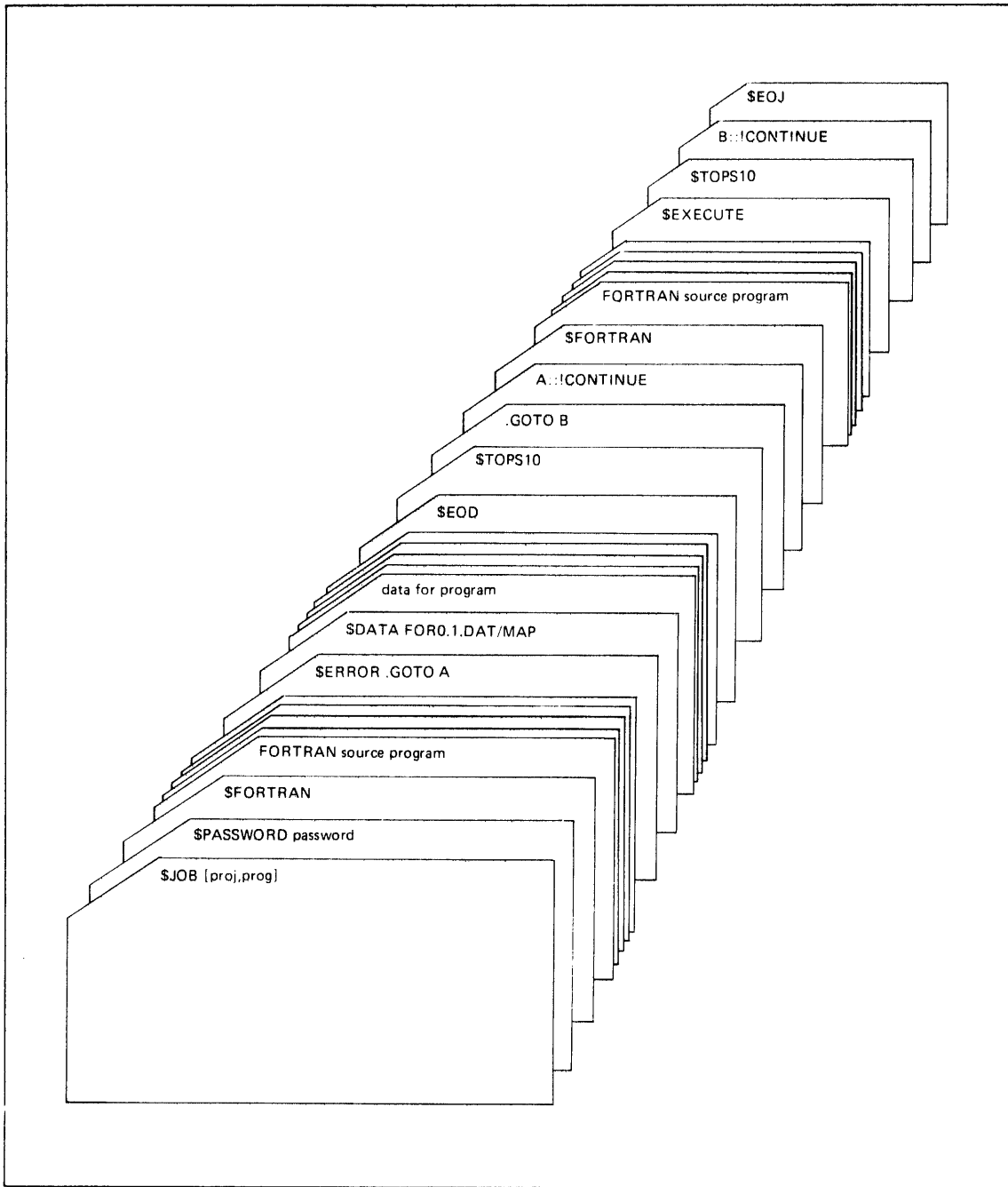


Figure 3-7 Card Deck with Error Recovery Program

ENTERING A BATCH JOB FROM CARDS

These cards set up the following control file for you.

```
.COMPIL /COMP/F10 DSK:LNxxxx.FOR/LIST
.IF (ERROR) .GOTO A
.EXECUT /REL/MAP:LPT:MAP DSK:LNxxxx.REL
.GOTO B
A::
!CONTINUE
.COMPIL /COMP/F10 DSK:LNxxxx.FOR/LIST
.EXECUT DSK:LNxxxx.REL
B::
!CONTINUE
.DELETE DSK:LNxxxx.FOR,DSK:LNxxxx.REL,DSK:LNxxxx.FOR,DSK:LNxxxx.REL
```

The \$FORTRAN card told Batch to copy the program into a disk file, to create a unique filename for the program in the form LNxxxx.FOR, and to insert a COMPILE command into the control file. The \$ERROR card told Batch to insert .IF (ERROR) .GOTO A into the control file. The data was copied into a disk file and an EXECUTE command was put into the control file because of the \$DATA card. The \$TOPS10 card told Batch to start copying cards into the control file, so Batch put the next two lines into the control file. The second \$FORTRAN card told Batch to copy the program into a disk file, create another unique filename for the program in the form LNxxxx.FOR, and put a COMPILE command into the control file. A \$EXECUTE card was used instead of a \$DATA card because the data for the second program was already in a file on disk. The \$TOPS10 card caused the next line to be put into the control file.

When the job is started, Batch reads the control file and passes commands to the system. If an error occurs in the compilation of the first program, Batch executes the .GOTO command within the .IF statement. The command tells Batch to skip to the line labeled A, which contains a comment. Batch then proceeds to the next line. The second program is compiled and executed with the data. The next line is a comment, so Batch continues to the end of the control file. If an error does not occur in the first program, Batch skips the .IF statement, executes the program with the data, avoids the second program by skipping to label B, and continues to the end of the control file.

A variation of the above procedure, using the \$NOERROR card and .GOTO command is shown in Figure 3-8. The difference is that Batch skips the .IF statement if an error occurs and performs it if an error does not occur.

ENTERING A BATCH JOB FROM CARDS

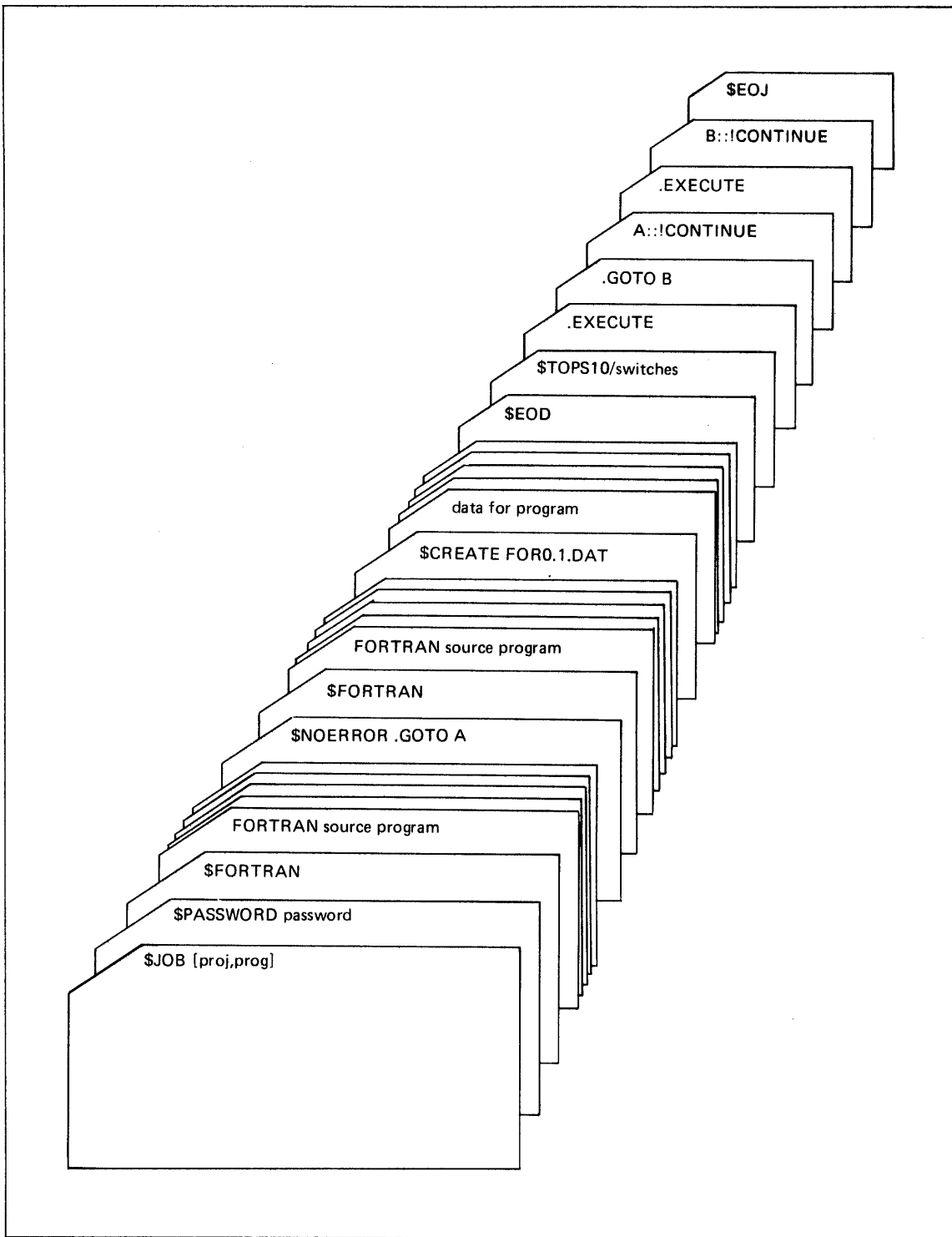


Figure 3-8 Card Deck Using GOTO Statement

ENTERING A BATCH JOB FROM CARDS

Batch reads the cards and puts the following commands into the control file.

```
.COMPIL /COMP/F10 DSK:LNxxxx.FOR/LIST
.IF(NOERROR) .GOTO A
.COMPIL /COMP/F10 DSK:LNxxxx.FOR/LIST
.EXECUT DSK:LNxxxx.REL
.GOTO B
A::
!CONTINUE
.EXECUT DSK:LNxxxx.REL
B::
!CONTINUE
.DELETE DSK:LNxxxx.FOR,DSK:LNxxxx.REL,DSK:LNxxxx.FOR,DSK:LNxxxx.REL
```

The \$FORTRAN card tells Batch to copy the FORTRAN program into a file, to create a unique filename of the form LNxxxx.FOR, and to insert a COMPILE command into the control file. The \$NOERROR card tells Batch to insert an .IF command into the control file.

The second \$FORTRAN card tells Batch to copy the second program into a disk file, to create a unique filename of the form LNxxxx.FOR, and to insert another COMPILE command into the control file. Instead of a \$DATA card, a \$CREATE card is used to tell Batch to copy the data into a disk file named FOR01.DAT. The \$DATA card is not used here because it would have the names of both programs in its list for the EXECUTE command generation, which would cause an error when the job is run. To tell Batch to start copying cards into the control file, the \$TOPS10 card comes next. Thus, Batch copies the next five cards into the control file.

When the job is run, Batch passes the COMPILE command to the system to compile the first program. If an error does not occur, the .IF command is read and the .GOTO command is executed. Batch skips to the line labeled A, which is a comment, and continues reading the control file. The program LNxxxx.FOR is executed with the data, and the end of the job is reached. If an error occurs while compiling the first program, Batch skips the .IF statement and continues reading the control file. The second program is compiled and then executed with the data. Batch is then told to go to the line labeled B, which is a comment line. The end of the job follows. The TOPS-10 .EXECUTE command was used in this job rather than the \$EXECUTE card. The \$EXECUTE card would have caused the names of both programs to be included in the .EXECUTE command which would have resulted in an error when the job was run.

The examples shown above illustrate only two ways that you can specify error recovery in the control file. You can use the .BACKTO command or any system command that you choose to help you recover from errors in your job.

However, you do not have to attempt to recover from errors while your job is running. You can correct your errors according to the error messages in the log file when your job is returned to you, and then run your job again.

CHAPTER 4

INTERPRETING YOUR PRINTED OUTPUT

You can receive three kinds of printed output from your Batch jobs:

1. Output that you request, i.e., the results of your job.
2. Output from Batch commands, i.e., the log file.
3. Output that is the result of actions by your job, Batch, the system, or system programs. Examples of this output are compilation listings, cross-reference listings, and error messages.

4.1 OUTPUT FROM YOUR JOB

If your job uses the PRINT command to print files on the line printer, the files will be printed in listings separate from the log file. The printed output from each program will be preceded by two banner pages containing your user name and other pertinent information. Following these pages are two header pages that contain the name of your output file in block letters; the output follows these header pages. Two trailer pages follow your output; they contain the same information that is on the first two pages. The header and trailer pages also include three rows of numbers (read vertically from 001 to 132) that represent the character print positions on the line printer.

If your output is usually directed to the terminal, it will be printed in the log file, not as a separate file. In the sample output shown in Section 4.4, the output from the program is included in the log file because it was directed to the terminal rather than the line printer.

Although this chapter deals mainly with printed output, you can have output to any device that the installation supports, as long as the installation allows you to use these devices.

4.2 BATCH OUTPUT

The output from Batch consists of a log file that contains all the statements in the control file, commands sent to the system from Batch for you, and the replies to the commands from the system and from system programs like the compilers. Any error message sent from the system or system program or from Batch itself is also written in the log file.

INTERPRETING YOUR PRINTED OUTPUT

When your Batch card job is printed on the line printer, it will have a unique filename of JBxxxx and a file type of .LOG. This file is deleted automatically after it has printed.

4.3 OTHER PRINTED OUTPUT

Other output that you can get as a result of action by your job includes compiler listings, cross-reference listings, and loader maps for programs that were successfully loaded.

The compiler and cross-reference listings are those listings generated by the compiler if you request them. When you enter your job from cards, Batch requests compilation listing for you unless you specify otherwise. Cross-reference listings are generated for you only if you specifically ask Batch for them. When you enter your job from a terminal, you must request the listings in the COMPILE command. Refer to the DECSYSTEM-10 (TOPS-10) Batch Reference Manual for the switches (/CREF, /MAP) that are available to generate additional listings for your Batch job.

If a fatal error occurs in a program in your job and you have not included an error recovery command to Batch, Batch will not try to recover from the error for you. Instead, it will write the error message in the log file and terminate your job.

4.4 SAMPLE BATCH OUTPUT

Two sample jobs and their output are shown in the following sections. The first shows a job entered from a terminal, the second shows a job entered from cards. The log file is somewhat different for the two types of jobs.

4.4.1 Sample Output of a Job from a Terminal

The following example illustrates a job as it would be entered from a terminal. You would first create the program as a file on disk.

```

      SP
      ↓
.SOS COBOL1.CBL (RET)
Input: COBOL1.CBL
00100 IDENTIFICATION DIVISION. (RET)
00200 PROGRAM-ID. COBOL1. (RET)
00300 ENVIRONMENT DIVISION. (RET)
00400 DATA DIVISION. (RET)
00500 PROCEDURE DIVISION. (RET)
00600 START. (RET)
00700 DISPLAY "THIS IS TO SHOW SAMPLE OUTPUT FROM BATCH." (RET)
00800 DISPLAY "THESE TWO LINES ARE OUTPUT FROM THE PROGRAM." (RET)
00900 STOP RUN. (RET)
01000 $
      ↑
      ESC
*E (RET)

[DISK:COBOL1.CBL]
.
```

INTERPRETING YOUR PRINTED OUTPUT

Then you would make up a control file to compile and execute the COBOL program.

```

      SP
      ↓
.SOS MYJOB.CTL RET
Input: MYJOB.CTL
00100 .COMPILE COBOL1.CBL/LIST RET
00200 .EXECUTE COBOL1.CBL RET
00300 $
      ↑
      ESC
*E RET

[DSKC:MYJOB.CTL]
.
```

You would then submit the job to Batch using the SUBMIT command.

```

      SP
      ↓
.SUBMIT MYJOB.CTL RET
[CINF26:MYJOB# /Seq:4951/Time:0:05:00]
.
```

When the job is run, the program is compiled and a listing is produced. The following listing is placed in the queue of the line-printer spooler:

```

PROGRAM      COBOL1          COBOL=68 12(526) BIS      5-APR-78 14:42
COBOL1,CBL   05-APR-78 14:52

0001  00100  IDENTIFICATION DIVISION.
0002  00200  PROGRAM=ID, MYPROG.
0003  00300  ENVIRONMENT DIVISION,
0004  00400  DATA DIVISION,
0005  00500  PROCEDURE DIVISION,
0006  00600  START.
0007  00700  DISPLAY "THIS IS TO SHOW SAMPLE OUTPUT FROM BATCH.",
0008  00800  DISPLAY "THESE TWO LINES ARE OUTPUT FROM THE PROGRAM.",
0009  00900  STOP RUN.

NO ERRORS DETECTED
```

The log file below is printed as your job's output. The output from the program is written in the log file because it is output to the terminal and the log file simulates the terminal dialogue. The log file also contains some commands that Batch sent to the system for you and some additional system information. An annotated log file is shown on the following page. Note that each line in the log file is preceded by the time of day when the line was written. Following the time is a word that describes what kind of information is on each line. Much of the information is system information and is described in detail in the DECsystem-10 (TOPS-10) Batch Reference Manual.

INTERPRETING YOUR PRINTED OUTPUT

```

15:42:29 BAJOB  BATCON version 103(2207) running MyJOB sequence 4951 in stream 1
15:42:29 BAFIL  Input from DSKC:MYJOB,CTL[27,5107]
15:42:29 BAFIL  Output to DSKC:MYJOB,LOG[27,5107]
15:42:29 BASUM  Job parameters
                    Time:00:05:00   Unique:YES   Restart:NO   Output:LOG

15:42:29 MONTR  ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:26/NAME:"BROWN,E"
15:42:29 MONTR  JOB 23   RK3A7A KL10 SYS#1026 TTY510
15:42:30 USER   [LGNJSP Other jobs same PPN:46]
15:42:35 USER   1542   01-Aug-78   Tue
15:42:36 MONTR  ,COMPILE COBOL1,CBL/LIST
15:42:36 MONTR  COBOL1 COBOL1 [COBOL1,CBL]
15:42:38 USER
15:42:50 MONTR  EXIT
15:42:50 MONTR  ,EXECUTE COBOL1,CBL
15:42:50 MONTR  LINK; Loading
15:42:51 USER   [LNKXCT COBOL1 Execution]
15:42:51 USER   THIS IS TO SHOW SAMPLE OUTPUT FROM BATCH,
15:42:51 USER   THESE TWO LINES ARE OUTPUT FROM THE PROGRAM,
15:42:51 MONTR  EXIT
15:42:51 MONTR  ,KJOB/BATCH
15:42:52 USER
15:42:52 USER   [LGTAJL Another job is still logged-in under [27,5107]]
15:42:54 MONTR  Job 23 User BROWN,E [27,5107]
15:42:54 MONTR  Logged-off TTY510 at 15:42:54 on 1-Aug-78
15:42:54 MONTR  Runtime: 0:00:01, KCS:22, Connect time: 0:00:24
15:42:54 MONTR  Disk Reads:954, Writes:92
    
```

4.4.2 Sample Output of a Job on Cards

This example shows a job in which a small COBOL program is compiled and executed. The card deck is shown in Figure 4-1.

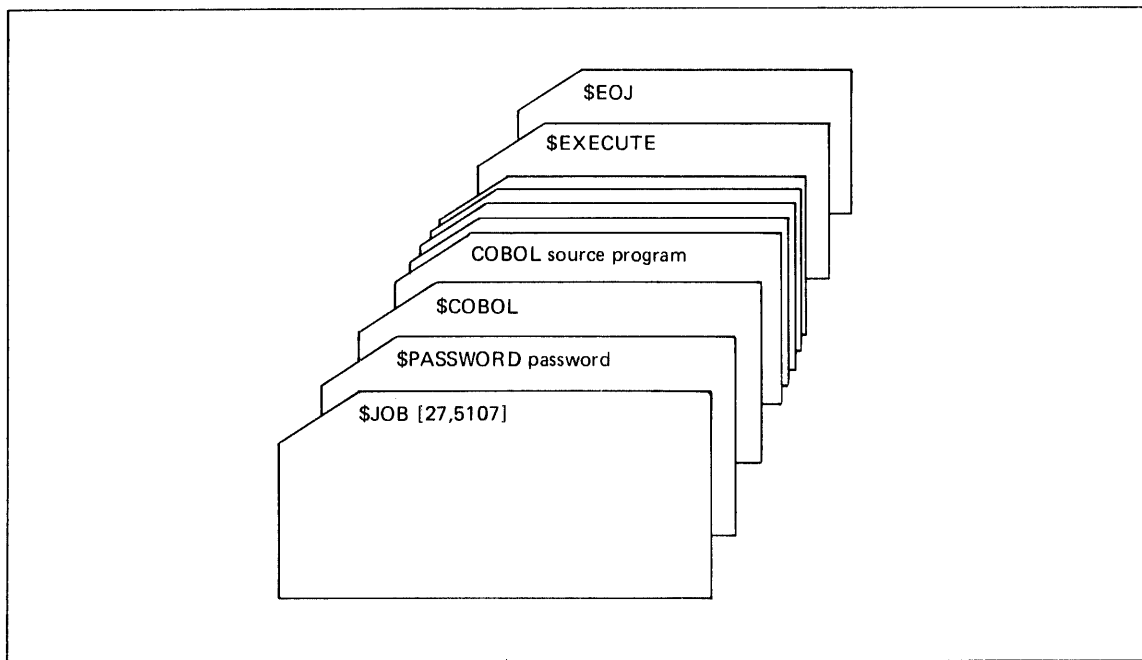


Figure 4-1 COBOL Print Program Card Deck

INTERPRETING YOUR PRINTED OUTPUT

The COBOL program is as follows.

```
IDENTIFICATION DIVISION.  
PROGRAM-ID. COBOL1.  
ENVIRONMENT DIVISION.  
DATA DIVISION.  
PROCEDURE DIVISION.  
START.  
DISPLAY "THIS IS TO SHOW SAMPLE OUTPUT FROM BATCH."  
DISPLAY "THESE TWO LINES ARE OUTPUT FROM THE PROGRAM."  
STOP RUN.
```

When the job is run, the program is compiled and a compilation listing is produced. The listing is shown below. Note that the compiler puts sequence numbers on the program even though they were not in the original program.

```
PROGRAM COBOL1          COBOL=68 12(526) BIS      7-APR-78 07101  
LNON3J,CBL      07-APR-78 07101  
  
0001  IDENTIFICATION DIVISION,  
0002  PROGRAM-ID, COBOL1,  
0003  ENVIRONMENT DIVISION,  
0004  DATA DIVISION,  
0005  PROCEDURE DIVISION,  
0006  START,  
0007  DISPLAY "THIS IS TO SHOW SAMPLE OUTPUT FROM BATCH",  
0008  DISPLAY "THESE TWO LINES ARE OUTPUT FROM THE PROGRAM",  
0009  STOP RUN,
```

NO ERRORS DETECTED

After the program is compiled, it is loaded and executed. The program in this example does not have output to the line printer. Instead its output is written to a terminal. Because this is a Batch job, the terminal output is written in the log file. The log file is printed because the end of the job is reached. The log file contains all the dialogue between your job and the system and system programs, and some commands that Batch sent to the system for you. An annotated log file is shown on the following pages. Note that each line in the log file is preceded by the time of day when the line was written. Following the time is a word that describes what kind of information is on each line. Refer to the DECsystem-10 (TOPS-10) Batch Reference Manual for a description and definition of these words.

```
13:39:12 STDAT 2-AUG-78   RK3A7A KL10 SYS#1026   SPRINT Version 102(2024)  
13:39:12 STCRD #JOB [27,5107]  
13:39:12 STCRD #COBOL  
13:39:14 STMSG File DSK:LNON3J,CBL Created = 9 Cards Read = 2 Blocks Written  
13:39:14 STCRD #EXECUTE  
13:39:14 STCRD #EOJ  
13:39:14 STSUM End of Job Encountered  
13:39:14 STSUM 14 Cards Read  
13:39:14 STSUM Batch Input Request Created
```

INTERPRETING YOUR PRINTED OUTPUT

```

13:42:44 BAJOB  BATCON version 102(2067) running JBON3I sequence 1258 in stream 1
13:42:44 BAFIL  Input from DSKC:JBON3I,CTL[27,5107]
13:42:44 BAFIL  Output to DSKC:JBON3I,LOG[27,5107]
13:42:44 BASUM  Job parameters
                    Time:00:05:00  Unique:YES  Restart:YES  Output:LOG

13:42:44 MONTR  ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:26/NAME:"BROWN,E"
13:42:44 MONTR  JUB 49      RK3A7A KL10 SY8#1026 TTY511
13:42:45 USER   [LGNJSP Other jobs same PPN:21
13:42:46 USER   1342      02-Aug-78      Wed
13:42:47 MONTR  ,COMPIL /COMP/COB DSK:LNON3J,CBL/LIST
13:42:47 MONTR  CUBOL: COBOL1 [LNON3J,CBL]
13:42:49 USER   EXIT
13:43:00 MONTR  ,EXECUT /REL DSK:LNON3J,REL
13:43:00 MONTR  LINK; Loading
13:43:01 USER   [LNKXCT COBOL1 Execution]
13:43:03 USER   THIS IS TO SHOW OUTPUT FROM BATCH,
13:43:03 USER   THESE TWO LINES ARE OUTPUT FROM THE PROGRAM,
13:43:03 MONTR  EXIT
13:43:03 MONTR  .
13:43:03 MONTR  %ERR;:
13:43:03 MONTR  %FIN;:
13:43:03 BLABL  ,DELETE DSK:LNON3J,CBL,DSK:LNON3J,REL
13:43:03 MONTR  Files deleted:
13:43:04 USER   LNON3J,CBL
13:43:04 USER   02 Blocks freed
13:43:04 USER   LNON3J,REL
13:43:04 USER   02 Blocks freed
13:43:04 MONTR  ,KJOB/BATCH
13:43:04 MONTR  [LGTAJL Another job is still logged-in Under [27,5107]]
13:43:04 USER   Job 49 User BROWN,E [27,5107]
13:43:05 MONTR  Logged-off TTY511 at 13:43:05 on 2-Aug-78
13:43:05 MONTR  Runtime: 0:00:01, KCS:26, Connect time: 0:00:20
13:43:05 MONTR  Disk Reads:976, Writes:98

```


CHAPTER 5
EXAMPLES OF COMMON TASKS WITH BATCH

This chapter shows some sample jobs that are run from a terminal and from cards. Section 5.1 illustrates entering jobs from a terminal. Section 5.2 shows entering jobs from cards. The examples are the same in both cases, the difference is in the way that they are entered.

5.1 USING THE TERMINAL TO ENTER JOBS

ALGOL Example

The first job is a simple ALGOL program that writes output to the terminal. Since the job is being entered through Batch, the output is written in the log file instead of on an actual terminal.

```

      SP
      ↓
SOS MYPROG.ALG (RET)
INPUT: MYPROG.ALG
00100 BEGIN (RET)
00200     REAL X;INTEGER I; (RET)
00300     X:=1; (RET)
00400     FOR I:= 1 UNTIL 1000 DO X := X+I ; (RET)
00500     PRINT (X); (RET)
00600     END (RET)
00700     $
      ↑
      ESC
*E (RET)

[DSKC:MYPROG.ALG]
.
```

The control file for the program is created as follows.

```

      SP
      ↓
.SOS MYFILE.CTL (RET)
INPUT: MYFILE.CTL
00100 .COMPILE MYPROG.ALG/LIST (RET)
00200 .EXECUTE MYPROG.ALG (RET)
00300     $
      ↑
      ESC
*E (RET)

[DSKC:MYFILE.CTL]
.
```

EXAMPLES OF COMMON TASKS WITH BATCH

To execute this ALGOL program using the Batch control file, issue the SUBMIT command.

```
      SP
      ↓
.SUBMIT MYFILE RET
[INP26:MYFILE=/SEQ:4805/TIME:0:05:00]
.
```

When Batch starts the job, the statements in the control file call the ALGOL compiler to compile the program. The TOPS-10 monitor then calls the loader to load the program for execution. A listing of the program will be printed with the log file shown on the following page.

```
DECSYSTEM 10 ALGOL-60, VERSION 6A(634) 01=AUG=78 12:36:03
COMMAND STRING: MYPROG,LPT;MYPROG=MYPROG,ALG
```

```
000004 B1 00100 BEGIN
START OF BLOCK 1
000005 00200 REAL X;INTEGER I;
000005 00300 X:=1;
000015 00400 FOR I:= 1 UNTIL 1000 DO X := X+1 ;
000021 00500 PRINT (X);
000024 E1 00600 END
END BLOCK 1, CONT 0
```

NO ERRORS

EXAMPLES OF COMMON TASKS WITH BATCH

```

12:35:55 BAJOB  BATCON VERSION 103(2207) RUNNING MYFILE SEQUENCE 4805 IN STREAM 5
12:35:55 BAFIL  INPUT FROM DSKC:MYFILE,CTL(27,5107)
12:35:55 BAFIL  OUTPUT TO DSKC:MYFILE,LOG(27,5107)
12:35:55 BASUM  JOB PARAMETERS
                TIME:00:05:00  UNIQUE:YES  RESTART:NO  OUTPUT:LOG

12:35:55 MONTR
12:35:55 MONTR  ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:26/NAME:"BROWN,E"
12:35:56 USER  JOB 26      RK3A7A KL10 SYS#1026 TTY513
12:36:00 USER  [LGNJSP OTHER JOBS SAME PPN:46]
12:36:00 USER  1236      01=AUG=78      TUE
12:36:01 MONTR
12:36:01 MONTR  ,,COMPILE MYPROG,ALG/LIST
12:36:03 USER  ALGOL: MYPROG
12:36:04 MONTR
12:36:04 MONTR  EXIT
12:36:04 MONTR
12:36:04 MONTR  ,,EXECUTE MYPROG,ALG
12:36:05 USER  LINK;  LOADING
12:36:06 USER  [LNKXCT MYPROG EXECUTION]
12:36:06 USER  1,0010000& 3
12:36:06 USER
12:36:06 USER  END OF EXECUTION,
12:36:06 MONTR
12:36:06 MONTR  ,KJOB/BATCH
12:36:07 USER
12:36:07 USER  [LGTAJL ANOTHER JOB IS STILL LOGGED-IN UNDER (27,5107)]
12:36:08 MONTR  JOB 26  USER BROWN,E (27,5107)
12:36:08 MONTR  LOGGED-OFF TTY513 AT 12:36:07 ON 1=AUG=78
12:36:08 MONTR  RUNTIME: 0:00:01, KCS:12, CONNECT TIME: 0:00:11
12:36:08 MONTR  DISK READS:646, WRITES:24

12:36:09 LPDAT  LPTSPL VERSION 103(2421)      RK3A7A KL10 SYS#1026
12:36:09 LPDAT  JOB MYFILE SEQUENCE #4805 ON LPT26: AT 1=AUG=78 12:36:09
12:36:13 LPMSG  [LPTSTF STARTING FILE DSKC:QPOS26,LPT(3,3)]
12:36:17 LPMSG  [LPTFPF FINISHED PRINTING FILE DSKC:QPOS26,LPT(3,3)]

```

EXAMPLES OF COMMON TASKS WITH BATCH

BASIC Example

The second example is a BASIC program submitted to Batch. You can make up the program file using BASIC and save it on disk. Then make up a control file that simulates the dialogue with the BASIC system. The program is shown below.

```

.R BASIC (RET)

READY
NEW (RET)
NEW PROGRAM NAME--MYBAS.BAS (RET)

READY
00100 INPUT D (RET)
00200 IF D = 2 THEN 1100 (RET)
00300 PRINT "X VALUE", "SINE", "RESOLUTION" (RET)
00400 FOR X=0 TO 3 STEP D (RET)
00500 IF SIN(X) <= M THEN 800 (RET)
00600 LET XO=X (RET)
00700 LET M=SIN(X) (RET)
00800 NEXT X (RET)
00900 PRINT XO,M,D (RET)
01000 GO TO 100 (RET)
01100 END (RET)
SAVE (RET)

READY
MONITOR (RET)
*

```

The program requests data from the your terminal when it is running. You include the data in the control file. For this program, the final data item must be 2 to conclude the program. The control file follows.

```

    (SP)
    ↓
.SOS BASIC.CTL (RET)
Input: BASIC.CTL
00100 .R BASIC (RET)
00200 *OLD DSK:MYBAS.BAS (RET)
00300 *RUN (RET)
00400 *.1 (RET)
00500 *.01 (RET)
00600 *.001 (RET)
00700 *2 (RET)
00800 *MONITOR (RET)
00900 $
    ↑
    (ESC)
*E (RET)

[BASIC.CTL.1]
*

```

EXAMPLES OF COMMON TASKS WITH BATCH

The output from the program will be printed as part of the control file listing. The command to submit the job to Batch is executed as follows.

```

      SP
      ↓
,SUBMIT BASIC.CTL (REF)
CINP26: BASIC=/Seq:4823/Time:0:05:00
  
```

```

12:48:40 BAJOB  BATCON VERSION 103(2207) RUNNING BASIC SEQUENCE 4823 IN STREAM 1
12:48:40 BAFIL  INPUT FROM DSKC: BASIC.CTL [27,5107]
12:48:40 BAFIL  OUTPUT TO DSKC: BASIC.LOG [27,5107]
12:48:40 BASUM  JOB PARAMETERS
                TIME:00:05:00    UNIQUE: YES    RESTART: NO    OUTPUT: LOG

12:48:40 MONTR
12:48:40 MONTR  ,LOGIN 27/5107 /DEFER/SPOOL: ALL/TIME: 300/LOCATE: 26/NAME: "BROWN,E"
12:48:41 USER  JOB 30    RK3A7A KL10 SYS#1026 TTY504
12:48:43 USER  [LGNJSP OTHER JOBS SAME PPN: 46]
12:48:43 USER  1248    01=AUG-78    TUE
12:48:44 MONTR
12:48:44 MONTR  ,R BASIC
12:48:44 USER
12:48:45 USER
12:48:45 USER  READY. FOR HELP TYPE HELP.
12:48:45 USER  OLD
12:48:45 USER  OLD FILE NAME==DSK: MYBAS,BAS
12:48:45 USER
12:48:45 USER  READY
12:48:45 USER  RUN
12:48:45 USER
12:48:45 USER  MYBAS          12:48          01=AUG-78
12:48:45 USER
12:48:45 USER
12:48:45 USER  7.1
12:48:45 USER  X VALUE      SINE      RESOLUTION
12:48:45 USER  1.6          0.999574    0.1
12:48:45 USER  7.01
12:48:45 USER  X VALUE      SINE      RESOLUTION
12:48:45 USER  1.57         1.          0.01
12:48:45 USER  7.001
12:48:45 USER  X VALUE      SINE      RESOLUTION
12:48:45 USER  1.571        1.          0.001
12:48:46 USER  72
12:48:46 USER
12:48:46 USER  TIME: 0.26 SECS.
12:48:46 USER
12:48:46 USER  READY
12:48:46 USER  MONITOR
12:48:46 MONTR
12:48:46 MONTR  ,KJOB/BATCH
12:48:46 USER
12:48:46 USER  [LGTAJL ANOTHER JOB IS STILL LOGGED-IN UNDER [27,5107]]
12:48:47 MONTR  JOB 30 USER BROWN,E [27,5107]
12:48:47 MONTR  LOGGED-OFF TTY504 AT 12:48:47 ON 1=AUG-78
12:48:47 MONTR  RUNTIME: 0:00:00, KCS19, CONNECT TIME: 0:00:06
12:48:47 MONTR  DISK READS: 94, WRITES: 6

12:48:49 LPDAT  LPTSPPL VERSION 103(2421)          RK3A7A KL10 SYS#1026
12:48:49 LPDAT  JOB BASIC SEQUENCE #4823 ON LPT261 AT 1=AUG-78 12:48:49
  
```

EXAMPLES OF COMMON TASKS WITH BATCH

FORTRAN Example

The third example is a FORTRAN program that prints output on the line printer. You want to tell Batch in the control file to delete your relocatable binary file if an error occurs when your program is executed. If an error does not occur, you want Batch to save your relocatable binary file as it normally would. The program is shown below.

```

      SP
      ↓
      .SOS MYPROG.FOR (RET)
      Input: MYPROG.FOR
      00100  C      THIS PROGRAM CALCULATES PRIME NUMBERS. (RET)
      00200      DO 10 I =11,50,2 (RET)
      00300      J=1 (RET)
      00400  4      J=J+2 (RET)
      00500      A=J (RET)
      00600      A=I/A (RET)
      00700      L=I/J (RET)
      00800      R=A-L (RET)
      00900      IF (R) 5,10,5 (RET)
      01000  5      IF (J.LT.SQRT(FLOAT(I))) GO TO 4 (RET)
      01100      PRINT 105,I (RET)
      01200  10     CONTINUE (RET)
      01300  105    FORMAT (I4, 'IS PRIME.')(RET)
      01400      END (RET)
      01500
      ↑
      $
      ↑
      ESC
      *E (RET)

      [DISK:MYPROG.FOR]
      .
  
```

You create the control file to compile and execute this program, deleting the relocatable binary file if there is an execution error as follows.

```

      SP
      ↓
      .SOS MYFOR.CTL (RET)
      Input: MYFOR.CTL
      00100  .COMPILE MYPROG.FOR (RET)
      00200  .EXECUTE MYPROG.REL (RET)
      00300  .IF(ERROR) .DELETE MYPROG.FOR (RET)
      00400  END:!!END OF JOB (RET)
      00500  $
      ↑
      ESC
      *E (RET)

      [DISK:MYFOR.CTL]
      .
  
```

You submit this job for execution as follows.

```

      SP
      ↓
      .SUBMIT MYFOR.CTL (RET)
      [INP26:MYFOR=/Seq:4834/Time:0:05:00]
      .
  
```

EXAMPLES OF COMMON TASKS WITH BATCH

The program output is as follows.

```

11 IS PRIME,
13 IS PRIME,
17 IS PRIME,
19 IS PRIME,
23 IS PRIME,
29 IS PRIME,
31 IS PRIME,
37 IS PRIME,
41 IS PRIME,
43 IS PRIME,
47 IS PRIME,

```

The log file produced by the job is as follows.

```

13:01:48 BAJOB  BATCON VERSION 103(2207) RUNNING MYFOR SEQUENCE 4834 IN STREAM 1
13:01:48 BAFIL  INPUT FROM DSKC:MYFOR,CTL(27,5107)
13:01:48 BAFIL  OUTPUT TO DSKC:MYFOR,LOG(27,5107)
13:01:48 BASUM  JOB PARAMETERS
                TIME:00:05:00  UNIQUE:YES  RESTART:NO  OUTPUT:LOG

13:01:48 MONTR  ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:26/NAME:"BROWN,E"
13:01:48 MONTR  ,
13:01:48 USER   JOB 30      RK3A7A KL10 SYS#1026 TTY504
13:01:51 USER   [LGNJSP OTHER JOBS SAME PPN:46]
13:01:51 USER   1301      01-AUG-78      TUE
13:01:52 MONTR  ,
13:01:52 MONTR  ,,COMPILE MYPROG,FOR
13:01:53 USER   FORTRAN; MYPROG
13:01:55 USER   MAIN,
13:01:55 MONTR  ,
13:01:55 MONTR  ,,EXECUTE MYPROG,REL
13:01:56 USER   LINK;  LOADING
13:01:57 USER   [LNKXCT MYPROG EXECUTION]
13:01:59 USER   ,
13:01:59 USER   END OF EXECUTION
13:01:59 USER   CPU TIME: 0.04 ELAPSED TIME: 0.65
13:01:59 MONTR  EXIT
13:01:59 MONTR  ,
13:01:59 MONTR  ,IF (ERROR) ,DELETE MYPROG,FOR
13:01:59 FALSE  END;
13:01:59 BLABL  |END OF JOB
13:01:59 MONTR  ,KJOB/BATCH
13:01:59 USER   ,
13:01:59 USER   [LGTAJL ANOTHER JOB IS STILL LOGGED-IN UNDER (27,5107)]
13:02:01 MONTR  JOB 30  USER BROWN,E (27,5107)
13:02:01 MONTR  LOGGED-OFF TTY504 AT 13:02:01 ON  1-AUG-78
13:02:01 MONTR  RUNTIME: 0:00:00, KCS:11, CONNECT TIME: 0:00:12
13:02:01 MONTR  DISK READS:302, WRITES:19

13:12:35 LPDAT  LPT8PL VERSION 103(2421)                RK3A7A KL10 SYS#1026
13:12:35 LPDAT  JOB MYFOR SEQUENCE #4834 ON LPT261 AT 1-AUG-78 13:12:35
13:12:38 LPMSG  [LPTSTF STARTING FILE DSKC:QP1526,LPT(3,3)]
13:12:44 LPMSG  [LPTPPF FINISHED PRINTING FILE DSKC:QP1526,LPT(3,3)]

```

COBOL Example

The fourth example is a COBOL program that writes record output on a magnetic tape. To have a tape drive assigned and your magnetic tape mounted on it, you must make a request to the operator. Since you do not know which drive will be assigned to your job, you must assign it in your job with a logical device name. The MOUNT command assigns the drive to your job and associates the logical name that you specify

EXAMPLES OF COMMON TASKS WITH BATCH

with the physical drive assigned. The MOUNT command also informs the operator of the name or ID number that identifies the particular tape you want mounted. (Your tape should be given to the operator or stored at the central site before you submit your job.) You create the program as follows.

```

      SP
      ↓
    .SOS MYPROG.CBL (RET)
Input: MYPROG.CBL
00100 IDENTIFICATION DIVISION. (RET)
00200 ENVIRONMENT DIVISION. (RET)
00300 INPUT-OUTPUT SECTION. (RET)
00400 FILE-CONTROL. (RET)
00500         SELECT OUTFIL ASSIGN TPDIV. (RET)
00600 DATA DIVISION. (RET)
00700 FILE SECTION. (RET)
00800 FD OUTFIL LABEL RECORDS ARE STANDARD (RET)
00900         VALUE OF IDENTIFICATION IS "INFIL DAT" (RET)
01000         DATA RECORD IS OUTREC (RET)
01100         BLOCK CONTAINS 20 RECORDS. (RET)
01200 01 OUTREC PIC X(80). (RET)
01300 WORKING-STORAGE SECTION. (RET)
01400 77 A PIC 9999 USAGE IS COMP. (RET)
01500 PROCEDURE DIVISION. (RET)
01600 START. (RET)
01700     OPEN OUTPUT OUTFIL. (RET)
01800     MOVE ZEROS TO OUTREC. (RET)
01900     MOVE 1000 TO A. (RET)
02000 LOOP. (RET)
02100     WRITE OUTREC. (RET)
02200     SUBTRACT 1 FROM A. (RET)
02300     IF A IS GREATER THAN ZERO GO TO LOOP. (RET)
02400     CLOSE OUTFIL. (RET)
02500     STOP RUN. (RET)
02600
      $
      ↑
    *E (RET)

[DISK:MYPROG.CBL]

```

You create the control file (COBJOB) used to run the program (PROG1.CBL) as follows.

```

      SP
      ↓
    .SOS COBJOB.CTL (RET)
Input: COBJOB.CTL
00100 .MOUNT MTA:MAG1/REELID:SCRATCH/WENABLE (RET)
00200 .COMPILE MYPROG.CBL/LIST (RET)
00300 .EXECUTE MYPROG.CBL (RET)
00400 .DISMOUNT MAG1: (RET)
00500
      $
      ↑
    *E (RET)

[DISK:COBJOB.CTL]

```


EXAMPLES OF COMMON TASKS WITH BATCH

You submit the job for execution as follows.

```

      SP
      ↓
    .SUBMIT COBJOB.CTL (REF)
    CINF26:COBJOB=/Seq:1072/Time:0:05:00]
  
```

The log file produced by COBJOB is shown below.

```

12:34:25 BAJOB  BATCON version 103(2207) running COBJOB sequence 1072 in stream 1
12:34:25 BAFIL  Input from DSKB:COBJOB,CTL(27,5031)
12:34:25 BAFIL  Output to DSKB:COBJOB,LOG(27,5031)
12:34:25 BASUM  Job parameters
                  Time:00:05:00  Unique:YES  Restart:NO  Output:LOG

12:34:25 MONTR  ..LOGIN 27/5031 /DEFER/SPOOL:ALL/TIME:300/NAME:"LAMAR,B"
12:34:25 MONTR  JOB 13 KI10 SYS 514C 603A TTY103
12:34:26 USER  [LGNJSP Other jobs same PPN:14]
12:34:26 USER  [LGNRDU Recomputing disk usage]
12:34:31 USER  [LGNQTA DSKB IN:10000 OUT:5000 USED:1660]
12:34:31 USER  1234 02-Aug-78 Wed
12:34:32 MONTR  ..MOUNT MTA:MAG1/REELID:5CRTCH/WENABLE
12:34:32 MONTR  Request queued
12:34:34 USER  Waiting...2 "C's to Exit
12:34:34 USER  MAG1 mounted, MTA001 Used
12:36:01 USER
12:36:01 MONTR  ..COMPILE MYPROG,CBL/LIST
12:36:01 USER  COBOL: MAIN [MYPROG,CBL]
12:36:08 MONTR  EXIT
12:36:08 MONTR
12:36:08 MONTR  ..EXECUTE MYPROG,CBL
12:36:08 USER  LINK: Loading
12:36:09 USER  [LNKXCT MYPROG Execution]
12:36:11 MONTR  EXIT
12:36:11 MONTR
12:36:11 MONTR  ..DISMOUNT MAG1
12:36:13 USER
12:36:13 USER  [MTA001:5CRTCH WRITE(C/H/S) = 75130/0/0]
12:36:13 USER  Request queued
12:36:13 USER  Waiting...2 "C's to Exit
12:37:58 USER  MTA001 Dismounted
12:37:58 MONTR  ,KJOB/BATCH
12:37:58 MONTR
12:37:58 USER  [LGTAJL Another job is still logged-in Under (27,5031)]
12:37:59 USER  Job 13 User LAMAR,B (27,5031)
12:37:59 USER  Logged-off TTY103 at 12:37:59 on 2-Aug-78
12:37:59 USER  Runtime: 0:00.04, KCS:76, Connect time: 0:03:33
12:37:59 USER  Disk Reads:282, Writes:108

12:37:59 LPDAT  LPTSP version 103(2421) KI10 SYS 514C 603A
12:37:59 LPDAT  Job COBJOB sequence #1072 on LPT000 at 2-Aug-78 12:37:59
  
```

EXAMPLES OF COMMON TASKS WITH BATCH

5.2 USING CARDS TO ENTER JOBS

ALGOL Example

The first job is a simple ALGOL program that writes its output into the log file because it has statements that would cause it normally to write to the terminal. The program is as follows.

```
BEGIN
  REAL X;INTEGER I;
  X :=1;
  FOR I :=1 UNTIL 1000 DO X:=X+1;
  PRINT (X);
END
```

The cards to enter this program are shown in Figure 5-1.

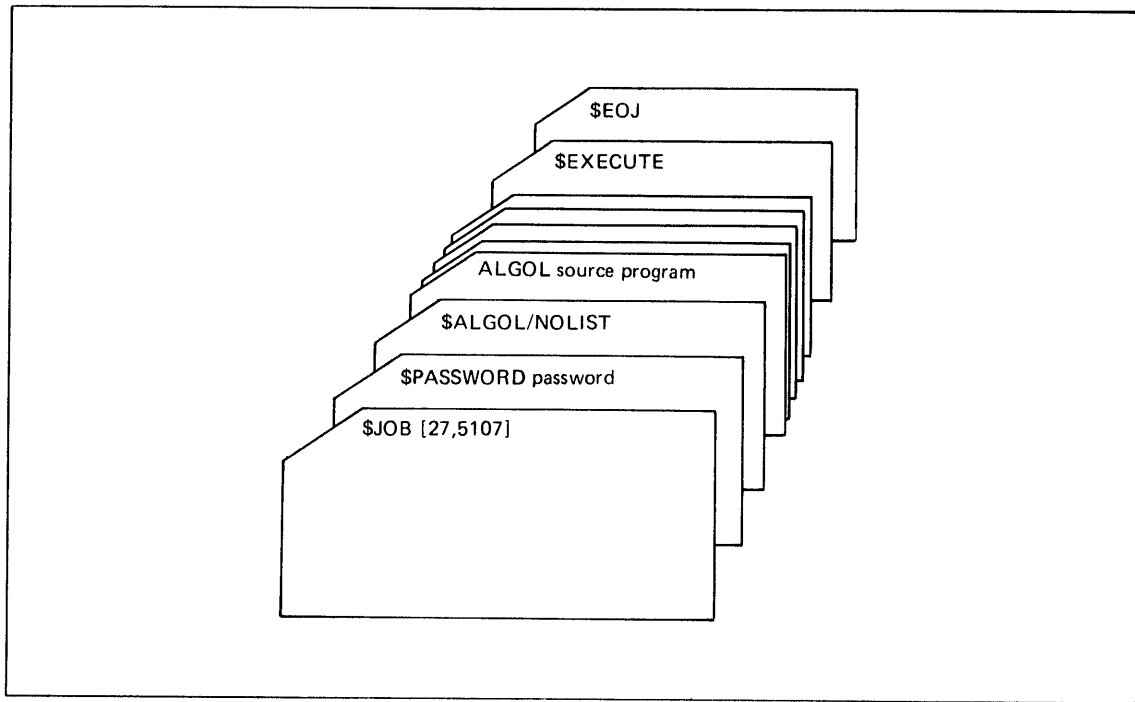


Figure 5-1 ALGOL Job Entry Card Deck

EXAMPLES OF COMMON TASKS WITH BATCH

The output, including the log file, is shown below.

```

13:39:16 STDAT 2-AUG-78      RK3A7A KL10 SYS#1026      SPRINT Version 102(2024)
13:39:16 STCRD $JOB [27,5107]
13:39:16 STCRD $ALGOL/NOLIST
13:39:17 STMSG File DSK:LNON3L,ALG Created = 6 Cards Read = 1 Blocks Written
13:39:17 STCRD $EXECUTE
13:39:17 STCRD $EOJ
13:39:17 STSUM End of Job Encountered
13:39:17 STSUM 11 Cards Read
13:39:17 STSUM Batch Input Request Created

13:43:06 BAJOB BATCON version 102(2067) running JOBON3K sequence 1259 in stream 1
13:43:06 BAFIL Input from DSKC:JBON3K,CTL(27,5107)
13:43:06 BAFIL Output to DSKC:JBON3K,LOG(27,5107)
13:43:06 BASUM Job parameters
Time:00:05:00 Unique:YES Restart:YES Output:LOG

13:43:06 MONTR
13:43:21 MONTR ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:26/NAME:"BROWN,E"
13:43:22 USER JOB 49      RK3A7A KL10 SYS#1026 TTY511
13:43:23 USER [LGNJSP Other jobs same PPN:21]
13:43:23 USER 1343 02-Aug-78 Wed
13:43:24 MONTR
13:43:24 MONTR ,,COMPILE /COMP/ALG DSK:LNON3L,ALG
13:43:27 USER ALGOL: LNON3L
13:43:27 MONTR
13:43:27 MONTR EXIT
13:43:27 MONTR
13:43:27 MONTR ,,EXECUTE /REL DSK:LNON3L,REL
13:43:28 USER LINK: Loading
13:43:31 USER [LNKXCT LNON3L Execution]
13:43:32 USER 1,00100004 3
13:43:32 USER
13:43:32 USER End of execution,
13:43:32 MONTR
13:43:32 MONTR
13:43:32 BLABL $ERR:;
13:43:32 BLABL $FIN:;
13:43:32 MONTR ,DELETE DSK:LNON3L,ALG,DSK:LNON3L,REL
13:43:32 USER File deleted:
13:43:33 USER LNON3L,ALG
13:43:33 USER 01 Blocks freed
13:43:33 USER LNON3L,REL
13:43:33 USER 01 Blocks freed
13:43:33 MONTR
13:43:33 MONTR ,KJOB/BATCH
13:43:33 USER
13:43:33 USER [LGTJL Another job is still logged-in Under [27,5107]]
13:43:55 MONTR Job 49 User BROWN,E [27,5107]
13:43:55 MONTR Logged-off TTY511 at 13:43:55 on 2-Aug-78
13:43:55 MONTR Runtime: 0:00:01, KCS:11, Connect time: 0:00:32
13:43:55 MONTR Disk Reads:645, Writes:19

```

BASIC Example

The next example shows how to enter a BASIC program. You must precede the program commands with a \$CREATE card so that the program will be copied into a file on disk. No \$DATA card can be used because BASIC does not use the EXECUTE command and because the data is entered by means of the control file: the program requests data when it is running; it finds the data in the control file. For this program the final data item in the control file must be 2 so that the program can be concluded. The program is shown on the following page.

EXAMPLES OF COMMON TASKS WITH BATCH

```
5  INPUT D
10 IF D=2 THEN 100
20 PRINT "X VALUE", "SINE", "RESOLUTION"
30 FOR X=0 TO 3 STEP D
40 IF SIN(X)=M THEN 80
50 LET X0=X
60 LET M=SIN(X)
70 NEXT X
80 PRINT X0,M,D
90 GO TO 5
100 END
```

The cards to enter the program and run it are shown in Figure 5-2.

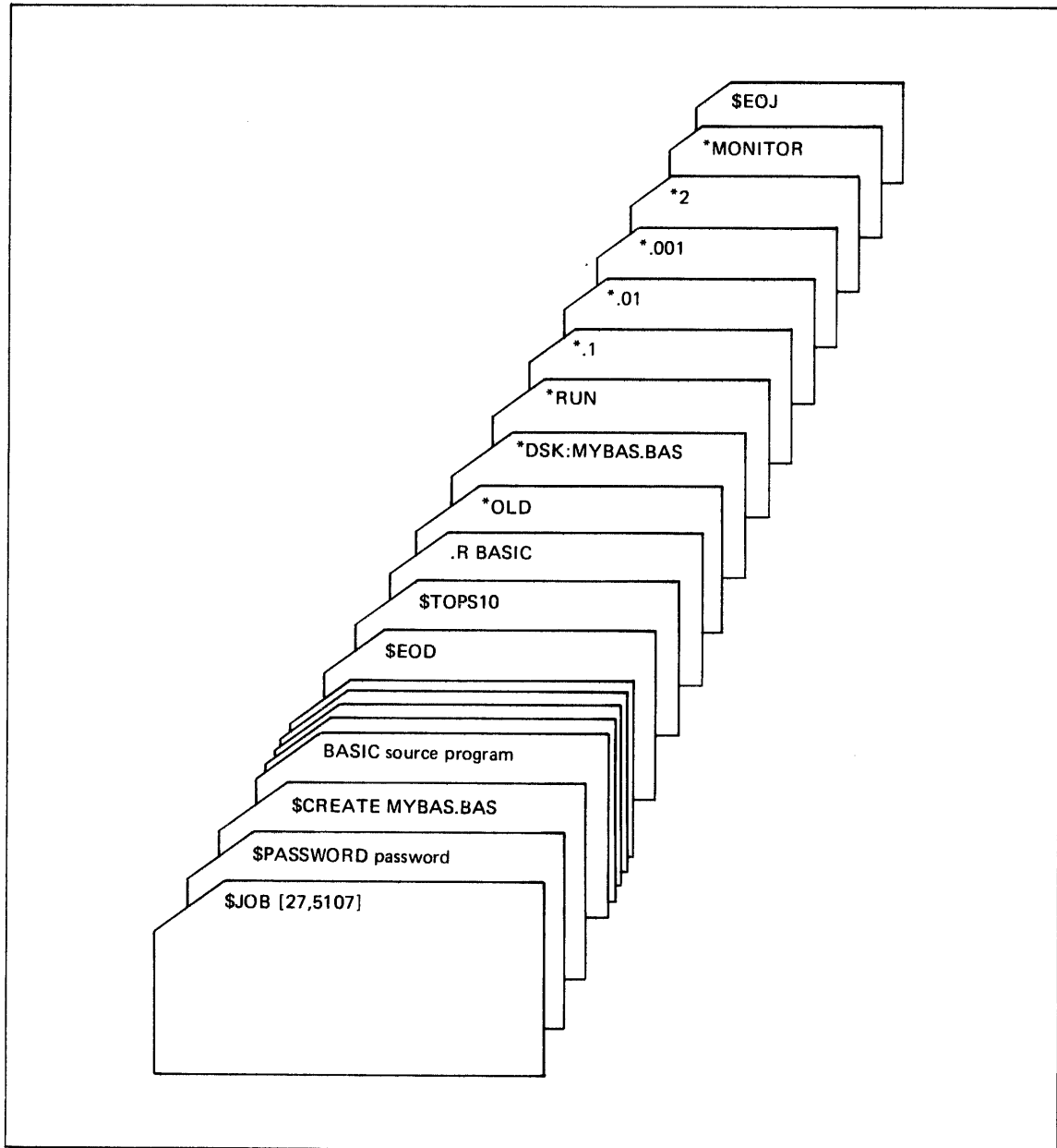


Figure 5-2 BASIC Job Entry and Run Card Deck

EXAMPLES OF COMMON TASKS WITH BATCH

The output from the program will be printed in the log file because it would normally be printed on the terminal. The log file is shown below.

```

13:39:19 STDAT 2=AUG-78      RK3A7A KL10 SYS#1026      SPRINT Version 102(2024)
13:39:19 STCRD $JOB [27,5107]
13:39:19 STCRD $CREATE MYBAS,BAS
13:39:21 STMSG File DSK:MYBAS,BAS Created = 11 Cards Read = 2 Blocks Written
13:39:21 STCRD $EOD
13:39:21 STCRD $TOPs10
13:39:23 STCRD $EOJ
13:39:23 STSUM End of Job Encountered
13:39:23 STSUM 26 Cards Read
13:39:23 STSUM Batch Input Request Created

13:43:56 BAJOB BATCON Version 102(2067) running JBON3M sequence 1260 in stream 1
13:43:56 BAFIL Input from DSKC:JBON3M,CTL[27,5107]
13:43:56 BAFIL Output to DSKC:JBON3M,LOG[27,5107]
13:43:56 BASUM Job parameters
Time:00:05:00 Unique:YES Restart:YES Output:LOG

13:43:56 MONTR
13:43:56 MONTR ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:126/NAME:"BROWN,E"
13:43:57 USER JOB 49      RK3A7A KL10 SYS#1026 TTY511
13:44:10 USER [LGNJSP Other Jobs same PPN:21]
13:44:10 USER 1344      02=Aug-78      Wed
13:44:11 MONTR
13:44:11 MONTR ,.R BASIC
13:44:11 USER
13:44:11 USER
13:44:11 USER READY, FOR HELP TYPE HELP,
13:44:11 USER *OLD
13:44:12 USER OLD FILE NAME==*DSK:MYBAS,BAS
13:44:12 USER
13:44:12 USER READY
13:44:12 USER *RUN
13:44:12 USER
13:44:12 USER MYBAS      13:44      02=AUG-78
13:44:12 USER
13:44:12 USER
13:44:12 USER ?*,1
13:44:12 USER X VALUE      SINE      RESOLUTION
13:44:12 USER 0            0            0.1
13:44:12 USER ?*,01
13:44:12 USER X VALUE      SINE      RESOLUTION
13:44:12 USER 0            0            0.01
13:44:12 USER ?*,001
13:44:12 USER X VALUE      SINE      RESOLUTION
13:44:12 USER 0            0            0.001
13:44:12 USER ?*2
13:44:12 USER
13:44:12 USER TIME: 0.09 SECS,
13:44:12 USER
13:44:12 USER READY
13:44:12 USER *MONITOR
13:44:12 MONTR
13:44:12 MONTR
13:44:12 MONTR $ERR:;
13:44:12 MONTR
13:44:12 MONTR BTNECF End of the Control File while searching for $FIN

13:44:12 MONTR ,KJOB/BATCH
13:44:12 USER
13:44:12 USER [LGTAJL Another job is still logged=in under [27,5107]]
13:44:13 MONTR Job 49 User BROWN,E [27,5107]
13:44:13 MONTR Logged=off TTY511 at 13:44:13 on 2=Aug-78
13:44:13 MONTR Runtime: 0:00:06, KCS18, Connect time: 0:00:16
13:44:13 MONTR Disk Reads:88, Writes:6

```

EXAMPLES OF COMMON TASKS WITH BATCH

FORTRAN Example

The third example shows a FORTRAN program that prints output on the line printer. In the control file, you want to tell Batch to prevent execution if the program compiles incorrectly.

```
C   THIS PROGRAM CALCULATES PRIME NUMBERS FROM 11 TO 50.  
   DO 10 I=11,50,2  
     J=1  
4    J=J+2  
     A=J  
     A=I/A  
     L=I/J  
     B=A-L  
     IF (B) 5,10,5  
5    IF (J.LT.SQRT(FLOAT(I))) GO TO 4  
     PRINT 105,I  
10   CONTINUE  
105  FORMAT (I4, 'IS PRIME.')
```

END

The cards used to enter this program are shown in Figure 5-3.

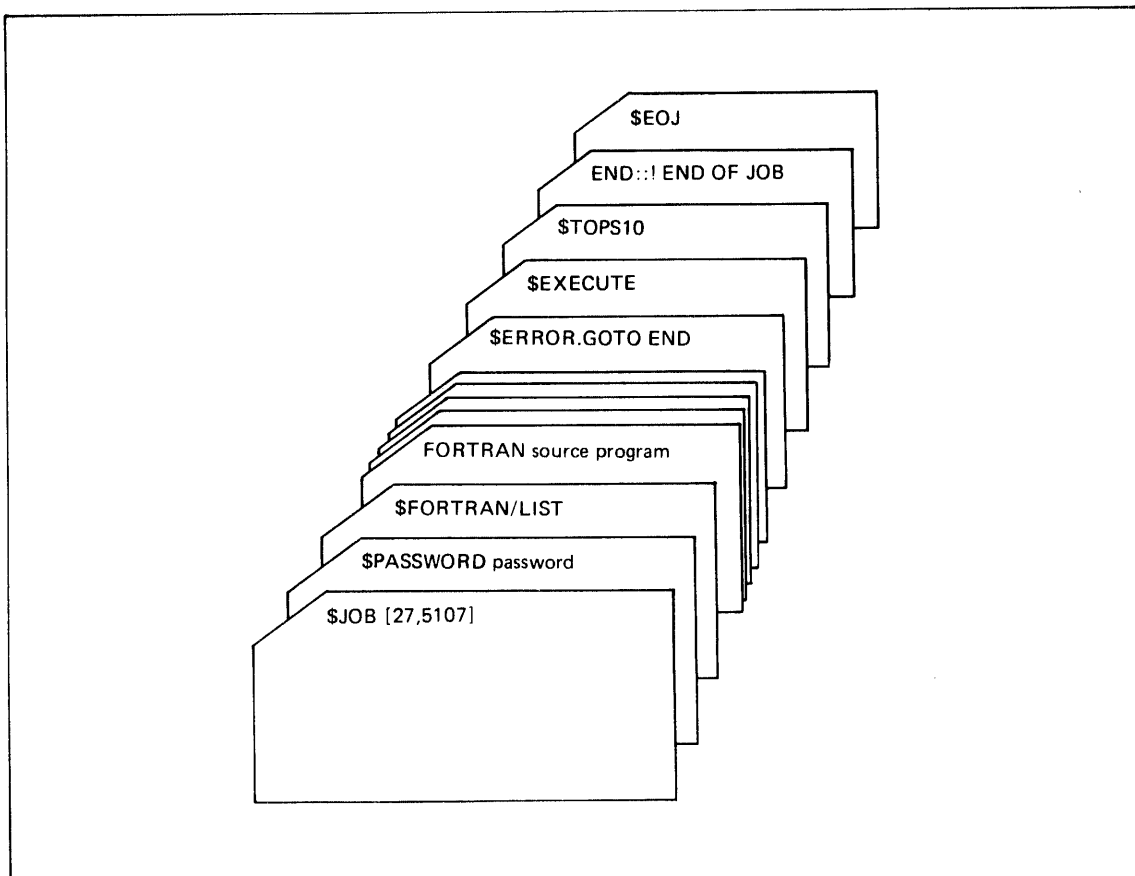


Figure 5-3 FORTRAN Card Deck That Prevents Execution on Error

EXAMPLES OF COMMON TASKS WITH BATCH

Batch puts the following commands into the control file as a result of the cards you entered.

```
.COMPIL /COMP/F10 DSK:LNON3F.FOR/LIST
.IF (ERROR) .GOTO END
.EXECUT /REL DSK:LNON3F.REL
END:;!END OF JOB
.DELETE DSK:LNON3F.FOR,DSK:LNON3F.REL
```

Program output is as follows.

MAIN, LNON3F,FOR FORTRAN V,5A(621) /KI 2-AUG-78 13:41 PAGE 1

```
00001 C THIS PROGRAM CALCULATES PRIME NUMBERS.
00002 DO 10 I=11,50,2
00003 J=1
00004 4 J=J+2
00005 A=J
00006 A=I/A
00007 L=I/J
00008 B=A=L
00009 IF(B)5,10,5
00010 5 IF(J,LT,SQRT(FLOAT(I))) GOTO 4
00011 PRINT 105,I
00012 10 CONTINUE
00013 105 FORMAT(14, ' IS PRIME,')
00014 END
```

SUBPROGRAMS CALLED

SQRT,
FLOAT,

SCALARS AND ARRAYS { "*" NO EXPLICIT DEFINITION = "%" NOT REFERENCED }

*B	1	*J	2	*A	3	,S0000	4	*L	5
*I	6								

TEMPORARIES

,00000 13

MAIN, (NO ERRORS DETECTED)

```
11 IS PRIME,
13 IS PRIME,
17 IS PRIME,
19 IS PRIME,
23 IS PRIME,
29 IS PRIME,
31 IS PRIME,
37 IS PRIME,
41 IS PRIME,
43 IS PRIME,
47 IS PRIME,
```

EXAMPLES OF COMMON TASKS WITH BATCH

The log file produced by the job is shown below.

```

13:38:58 STDAT 2=AUG-78 RK3A7A KL10 SYS#1026 SPRINT Version 102(2024)
13:38:58 STCRD $JOB [27,5107]
13:38:58 STCRD $FORTRAN/LIST
13:39:01 STMSG File DSK;LNON3F,FOR Created = 14 Cards Read = 2 Blocks Written
13:39:01 STCRD $ERROR ,GOTO END
13:39:01 STCRD $EXECUTE
13:39:01 STCRD $STOP$10
13:39:01 STCRD $EOJ
13:39:01 STSUM End of Job Encountered
13:39:01 STSUM 22 Cards Read
13:39:01 STSUM Batch Input Request Created
    
```

```

13:41:51 MONTR Job 49 User BROWN,E [27,5107]
13:41:51 MONTR Logged-off TTY511 at 13:41:51 on 2-Aug-78
13:41:51 MONTR Runtime: 0:00:01, KCS:25, Connect time: 0:00:23
13:41:51 MONTR Disk Reads: 1275, Writes:31
    
```

```

13:41:27 BAJOB BATCON version 102(2067) running JBON3E sequence 1256 in stream 1
13:41:27 BAFIL Input from DSKC;JBON3E,CTL[27,5107]
13:41:27 BAFIL Output to DSKC;JBON3E,LOG[27,5107]
13:41:27 BASUM Job parameters
Time:00:05:00 Unique:YES Restart:YES Output:LOG
    
```

```

13:41:27 MONTR
13:41:27 MONTR ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:26/NAME:"BROWN,E"
13:41:29 USER JOB 49 RK3A7A KL10 SYS#1026 TTY511
13:41:31 USER [LGNJSP Other jobs same PPN:21]
13:41:31 USER 1341 02-Aug-78 wed
13:41:32 MONTR
13:41:32 MONTR ,,COMPIL /COMP/F10 DSK;LNON3F,FOR/LIST
13:41:34 USER FORTRAN; LNON3F
13:41:43 USER MAIN.
13:41:44 MONTR
13:41:44 MONTR .
13:41:44 FALSE ,IF(ERROR) ,GOTO END
13:41:44 MONTR ,EXECUT /REL DSK;LNON3F,REL
13:41:45 USER LINK; Loading
13:41:47 USER [LNKXCT LNON3F Execution]
13:41:48 USER
13:41:48 USER END OF EXECUTION
13:41:48 USER CPU TIME: 0,04 ELAPSED TIME: 0,37
13:41:48 MONTR EXIT
13:41:48 MONTR
13:41:48 MONTR .
13:41:48 BLABL ENDI;
13:41:48 BLABL |END OF JOB
13:41:48 BLABL $ERR;
13:41:48 BLABL $FIN;
13:41:48 MONTR ,DELETE DSK;LNON3F,FOR,DSK;LNON3F,REL
13:41:49 USER Files deleted:
13:41:49 USER LNON3F,FOR
13:41:49 USER 02 Blocks freed
13:41:50 USER LNON3F,REL
13:41:50 USER 02 Blocks freed
13:41:50 MONTR
13:41:50 MONTR ,KJOB/BATCH
13:41:50 USER
13:41:50 USER [LGTAJL Another job is still logged-in Under [27,5107]]
    
```


EXAMPLES OF COMMON TASKS WITH BATCH

COBOL Example

The fourth example is a COBOL program that writes record output on a magnetic tape. To have a tape drive assigned and your magnetic tape mounted on it, you must make a request to the operator. Since you do not know which drive will be assigned to your job, you must assign it in your job with a logical device name. The TMOUNT command assigns the drive to your job and associates the logical name that you specify with the physical drive assigned. The TMOUNT command also informs the operator of the name or ID number that identifies the particular tape you want mounted. (Your tape should be given to the operator or stored at the central site before you submit your job.) The program is as follows.

```
IDENTIFICATION DIVISION.
ENVIRONMENT DIVISION.
INPUT-OUTPUT SECTION.
FILE-CONTROL.
    SELECT OUTFIL ASSIGN TPDRIV.
DATA DIVISION.
FILE SECTION.
FD OUTFIL LABEL RECORDS ARE STANDARD
    VALUE OF IDENTIFICATION IS "INFIL DAT"
    DATA RECORD IS OUTREC
    BLOCK CONTAINS 20 RECORDS.
01 OUTREC PIC X(80).
WORKING-STORAGE SECTION.
77 A PIC 9999 USAGE IS COMP.
PROCEDURE DIVISION.
START.
    OPEN OUTPUT OUTFIL.
    MOVE ZEROS TO OUTREC.
    MOVE 1000 TO A.
LOOP.
    WRITE OUTREC.
    SUBTRACT 1 FROM A.
    IF A IS GREATER THAN ZERO GO TO LOOP.
    CLOSE OUTFIL.
STOP RUN.
```

The cards to enter this job are shown in Figure 5-4.

EXAMPLES OF COMMON TASKS WITH BATCH

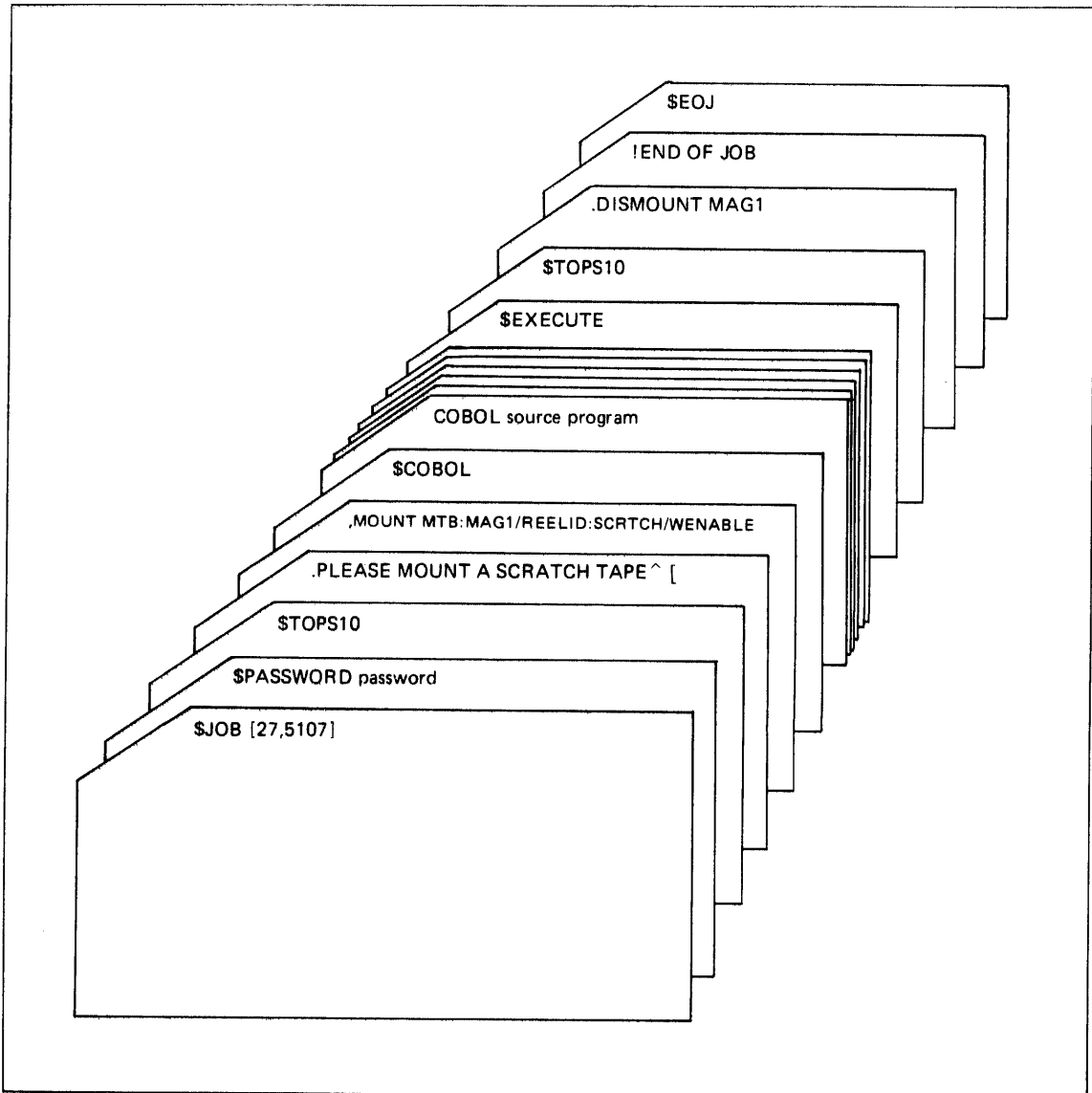


Figure 5-4 COBOL Program Card Deck Using Data From Magnetic Tape

Batch puts the following commands into the control file for you.

```
.PLEASE MOUNT A SCRATCH TAPE ^ [  
.MOUNT MTB:MAG1/REELID:SCRTCH/WENABLE  
.COMPIL /COMP/COB DSK:LNON3H.CBL/LIST  
.EXECUT /REL DSK:LNON3H.REL  
.DISMOUNT MAG1:  
.DELETE DSK:LNON3H.CBL,DSK:LNON3H.REL
```

The log file from your job is shown on the following page.

EXAMPLES OF COMMON TASKS WITH BATCH

```

13:39:04 STDAT 2=AUG-78      RK3A7A KL10 SYS#1026      SPRINT Version 102(2024)
13:39:04 STCRD $JOB [27,5107]
13:39:04 STCRD $TOP$10
13:39:04 STCRD $COBOL
13:39:10 STMSG File DSK:LNON3H,CBL Created = 25 Cards Read = 4 Block Written
13:39:10 STCRD $EXECUTE
13:39:10 STCRD $TOP$10
13:39:10 STCRD $EOJ
13:39:10 STSUM End of Job Encountered
13:39:10 STSUM 36 Cards Read
13:39:11 STSUM Batch Input Request Created

13:41:52 BAJOB BATCON version 102(2067) running JBON3G sequence 1257 in stream 1
13:41:52 BAFIL Input from DSKC:JBON3G,CTL[27,5107]
13:41:52 BAFIL Output to DSKC:JBON3G,LOG[27,5107]
13:41:52 BASUM Job parameters
Time:00:05:00 Unique:YES Restart:YES Output:LOG

13:41:52 MONTR
13:41:52 MONTR ,LOGIN 27/5107 /DEFER/SPOOL:ALL/TIME:300/LOCATE:26/NAME:"BROWN,E"
13:41:53 USER JOB 49      RK3A7A KL10 SYS#1026 TTY511
13:42:00 USER [LGNJSP Other jobs same PPN#21]
13:42:00 USER 1341      02-Aug-78      wed
13:42:01 MONTR
13:42:01 MONTR ,
13:42:01 BATCH ,PLEASE MOUNT A SCRATCH TAPE"1
13:42:01 MONTR ,MOUNT MTR;MAG1/REELID;SCRATCH/WENABLE
13:42:02 USEP Request queued
13:42:03 USER Waiting...2 "C's to Exit
13:42:24 USER MAG1 mounted, MTR264 used
13:42:24 MONTR
13:42:24 MONTR ,,COMPIL /COMP/COB DSK:LNON3H,CBL/LIST
13:42:25 USER CUBOL: MAIN [LNON3H,CBL]
13:42:35 MONTR
13:42:35 MONTR EXIT
13:42:35 MONTR
13:42:35 MONTR ,,EXECUT /REL DSK:LNON3H,REL
13:42:36 USEP LINK; Loading
13:42:38 USER [LNKXCT LNON3H Execution]
13:42:40 USER
13:42:40 USER EXIT
13:42:40 USER
13:42:40 MONTR ,,DISMOUNT MAG1;
13:42:40 USER [MTR264;SCRATCH WRITE(C/H/S) = 75130/0/0]
13:42:41 USER Request queued
13:42:41 USER Waiting...2 "C's to Exit
13:42:41 USEP MTR264 Dismounted
13:42:41 MONTR
13:42:41 MONTR ,
|END OF JOB
$ERR;|
$FIN;|
13:42:41 BLABL ,DELETE DSK:LNON3H,CBL,DSK:LNON3H,REL
13:42:41 MONTR Files deleted:
13:42:41 USER LNON3H,CBL
13:42:42 USER 04 Blocks freed
13:42:42 USER LNON3H,REL
13:42:42 USER 03 Blocks freed
13:42:42 MONTR
13:42:42 MONTR ,KJOB/BATCH
13:42:42 USER
13:42:42 USER [LGTAJL Another job is still logged-in under [27,5107]]
13:42:43 MONTR Job 49 User BROWN,E [27,5107]
13:42:43 MONTR Logged-off TTY511 at 13:42:43 on 2-Aug-78
13:42:43 MONTR Runtime: 0:00:02, KCS:33, Connect time: 0:00:51
13:42:53 MONTR Disk Reads:1168, Writes:118

```


GLOSSARY

Term	Definition
ALGOL	ALGORithmic Language. A scientifically oriented language that contains a complete syntax for describing computational algorithms.
Alphanumeric	Any of the letters of the alphabet (uppercase A through Z and lowercase a through z) and the numerals (0 through 9).
ASCII Code	American Standard Code for Information Interchange. Its 7-bit code is used to create a series of alphanumeric or special symbols.
Assemble	To prepare a machine-language program from a symbolic-language program by substituting absolute operation codes for symbolic operation codes and absolute or relocatable addresses for symbolic addresses.
Assembler	A program which accepts symbolic code and translates it into machine instructions, item by item. The assembler for TOPS-10 is called the MACRO assembler.
Assembly Language	The machine-oriented symbolic programming language. The assembly language for TOPS-10 is MACRO. MACRO statements are equivalent to one or more machine instructions.
Assembly Listing	A printed list which is the byproduct of an assembly run. It lists in logical-instruction sequence all details of a routine showing the symbolic notation next to the actual instructions generated by the assembler.
BASIC	Beginner's All-purpose Symbolic Instruction Code. A timesharing computer programming language that is used for direct communication between terminals and computer centers. BASIC employs English-like terms, is relatively easy to use, and has a wide range of applications.
Batch Processing	The technique whereby a computer executes one or more programs in your absence.
Card	A punched card with 80 vertical columns representing 80 characters. Each column is divided into two sections, one with character positions labeled 0 through 9, and the other with positions 11 and 12. The 11 and 12 positions are not labeled and are also referred to as the X and Y zone punches, respectively.

Term	Definition
Card Column	One of the vertical lines of punch positions on a punched card.
Card Field	A fixed number of consecutive card columns assigned to a unit of information.
Card Row	One of the horizontal lines of punch positions on a punched card.
Central Processing Unit (CPU)	The portion of the computer that contains the arithmetic, logical, control, and I/O interface circuits.
Character	One symbol of a set of elementary symbols such as those corresponding to the keys on a typewriter. The symbols usually include the decimal digits 0 through 9, the letters A, a through Z, z, punctuation marks, a space, operation symbols, and any other special symbols which a computer may read, store, or write.
COBOL	COmmon Business Oriented Language. A high-level source language widely used in business and commercial applications.
Command	An instruction that causes the computer to execute a specified operation.
Compile	To produce a machine- or intermediate-language routine from a routine written in a high-level language. A high-level language is user-oriented and one in which single statements may result in more than one machine-language instruction, e.g., FORTRAN, COBOL or ALGOL.
Compiler	A system program which translates a high-level source language into a language suitable for a particular machine. A compiler converts a source-language program into intermediate- or machine-language. Some compilers used on TOPS-10 are: ALGOL, COBOL, FORTRAN.
Computer	A device with self-contained memory capable of accepting information, processing the information, and outputting results.
Computer Operator	A person who has access to all software elements of a system and performs operational functions such as: loading a tape transport, placing cards in the card reader input hopper, removing printouts from the printer rack, etc.
Continuation Card	A punched card which contains information that was started on a previous punched card.
Control File	The file made by you that directs Batch in the processing of your job.
CPU	See Central Processing Unit.

Term	Definition
Cross-Reference Listing	A printed listing that identifies each reference of an assembled program with a specific label. This listing is provided immediately after a source program has been assembled.
Data	A general term used to denote any or all numbers, letters, and symbols, or facts that refer to or describe an object, idea, condition, situation, or other factors. It represents basic elements of information which can be processed or produced by a computer.
Debug	To locate and correct any mistakes in a computer program.
Disk	A form of a mass-storage device in which information is stored in named files.
Execute	To interpret an instruction or set of instructions and perform the indicated operation(s).
File	An ordered collection of 36-bit words composing computer instructions and/or data. A file can be of any length, limited only by the available space on the storage device and your maximum space allotment on that device.
Filename	A name of 1 to 6 alphanumeric characters chosen by the user to identify a file.
File Extension	A string of 1 to 3 alphanumeric characters, usually chosen to describe the kind of information in a file. The file extension must be separated from the filename by a period, e.g., FOR01.DAT.
FORTRAN	FORMula TRANslator. A procedure-oriented programming language that was designed for solving scientific problems. The language is widely used in many areas of engineering, mathematics, physics, chemistry, biology, psychology, industry, the military, and business.
Job	The entire sequence of tasks performed between login and logout at an interactive terminal, with a card deck, or at an operator's console.
Label	A symbolic name used to identify a statement in the control file or in a magnetic tape file or in a volume.
Log File	A file into which Batch writes a record of your entire job. This file may be printed as the final step in Batch's processing of a job.
MACRO	See Assembly Language.
Mounting a Device	A request to assign an I/O device via the operator.

Term	Definition
Object Program	The program which is the output of compilation or assembly. Often the object program is a machine-language program ready for execution.
Password	The secret word assigned to you that, along with your project-programmer number, uniquely identifies you to the system.
Peripheral Device	Any unit of equipment, distinct from the central processing unit, which can provide the system with outside storage or communication.
PPN	See Project-Programmer Number.
Program	The complete sequence of machine instructions and routines necessary to resolve one or more computational tasks.
Programming	The science of translating a problem from its physical environment to a language that a computer can understand and obey; also, the process of planning the procedure for solving a problem. This may involve, among other things, the analysis of the problem, preparation of a flowchart, coding of the problem, establishing input-output formats, establishing testing and checkout procedures, allocation of storage, preparation of documentation, and supervision of the running of the program on a computer.
Project-Programmer Number	Commonly referred to as PPN, these two numbers separated by a comma (,) identify you and your file storage area on a file structure.
Queue	A list of jobs to be scheduled or run according to system-, operator-, or user-assigned priorities. For example, the Batch input queue is the list of jobs to be processed by Batch.
Software	The totality of programs and routines used by a computer. Examples include compilers, assemblers, operator programs, service routines, utility routines, and subroutines.
Source Deck	A card deck that constitutes a computer program in symbolic language.
Source Language	The original form in which a program is prepared prior to its processing by the computer to produce the object-language program.
Source Program	A computer program written in a language designed for humans to use to express procedures or problem formulations. A translator (assembler, compiler, or interpreter) is used to translate the source program into an object- or machine-language program that can be run on a computer.
System	The collection of programs which schedules and controls the computing facility.

Term	Definition
System Command	An instruction to the system to perform an operation. The system commands for the TOPS-10 are described in the DECsystem-10 (TOPS-10) Operating System Commands Manual.
System Program	A program generally available to users, administrators, or operators for performing some specific function. Examples are a FORTRAN compiler or a text editor.
Terminal	A device containing a keyboard, similar to a typewriter, and a printing or display mechanism employed to establish communications with a computer.

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- Student programmer
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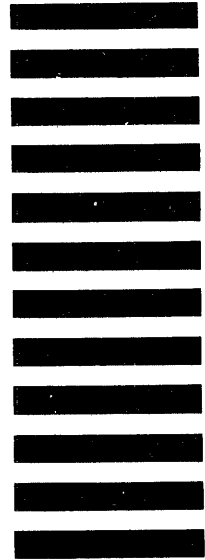
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