Chapter 2: Getting Started with SAS

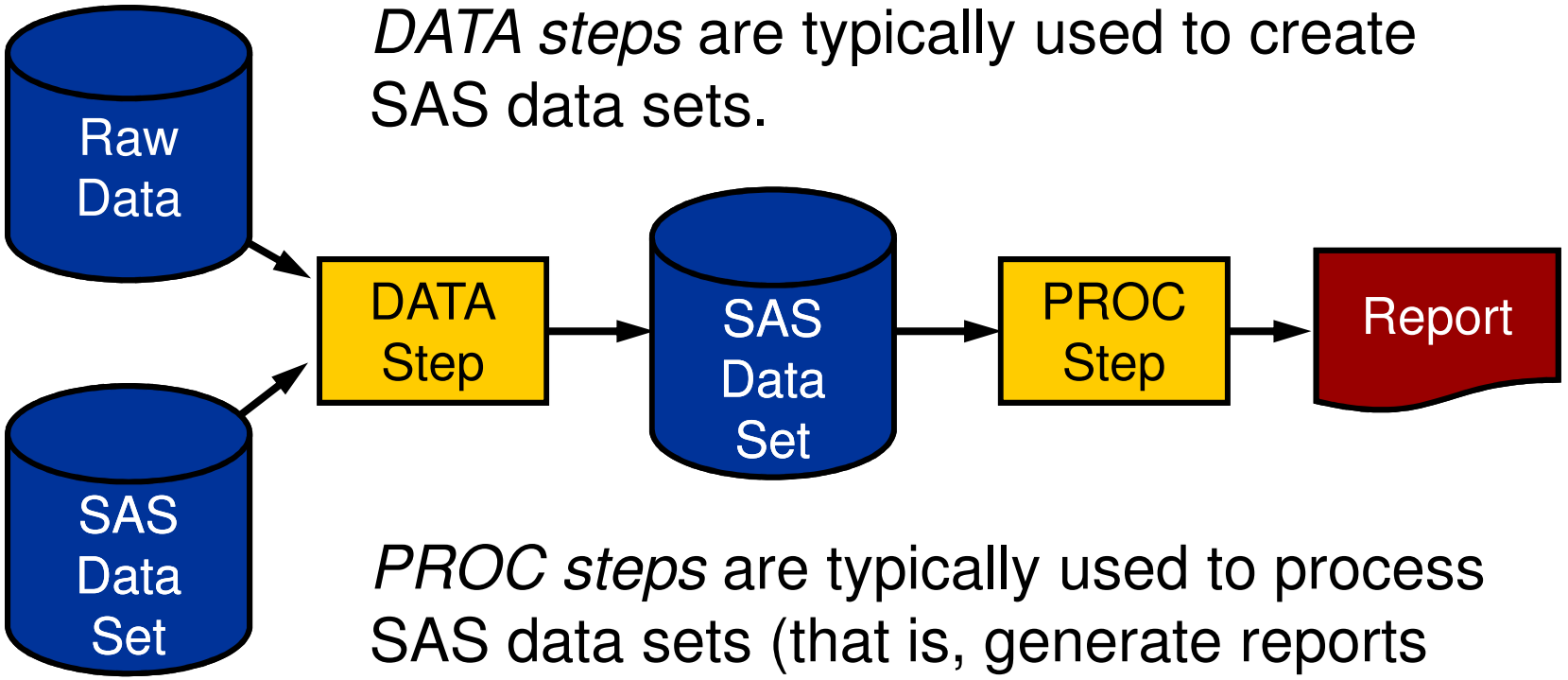
Chapter 2: Getting Started with SAS

Objectives

- List the components of a SAS program.
- State the modes in which you can run a SAS program.

SAS Programs

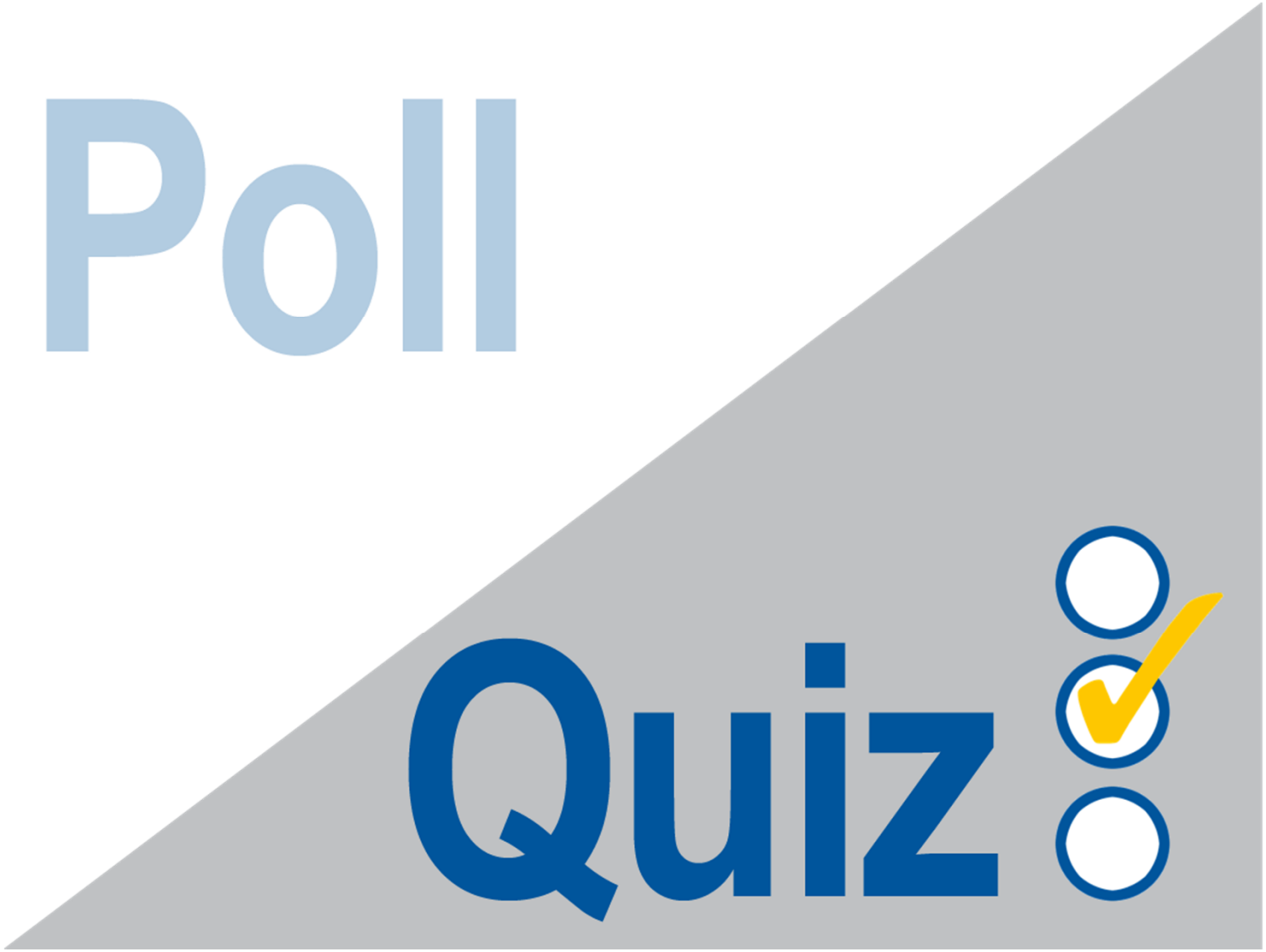
A *SAS program* is a sequence of steps that the user submits for execution.



DATA steps are typically used to create SAS data sets.

PROC steps are typically used to process SAS data sets (that is, generate reports and graphs, manage data, and sort data).

Poll



2.01 Quiz

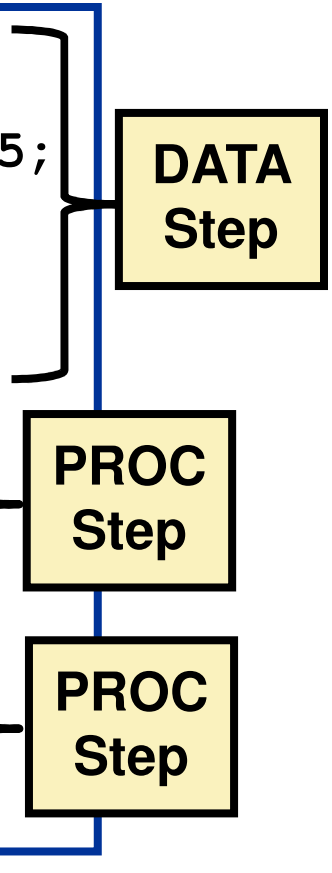
How many steps are in this program?

```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;
run;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
run;
```

2.01 Quiz – Correct Answer

How many steps are in this program?

```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;
run;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
run;
```



3 steps

SAS Program Example

This DATA step creates a temporary SAS data set named **Work.NewSalesEmps** by reading four fields from a raw data file.

```
data work.NewSalesEmps;
    length First_Name $ 12
           Last_Name $ 18 Job_Title $ 25;
    infile 'newemps.csv' dlm=',';
    input First_Name $ Last_Name $
          Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;
run;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
run;
```

SAS Program Example

This PROC PRINT step creates a listing report of the **Work.NewSalesEmps** data set.

```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;
run;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
run;
```

SAS Program Example

This PROC MEANS step creates a summary report of the **Work.NewSalesEmps** data set with statistics for the variable **Salary** for each value of **Job_Title**.

```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;
run;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
run;
```

Step Boundaries

SAS steps begin with either of the following:

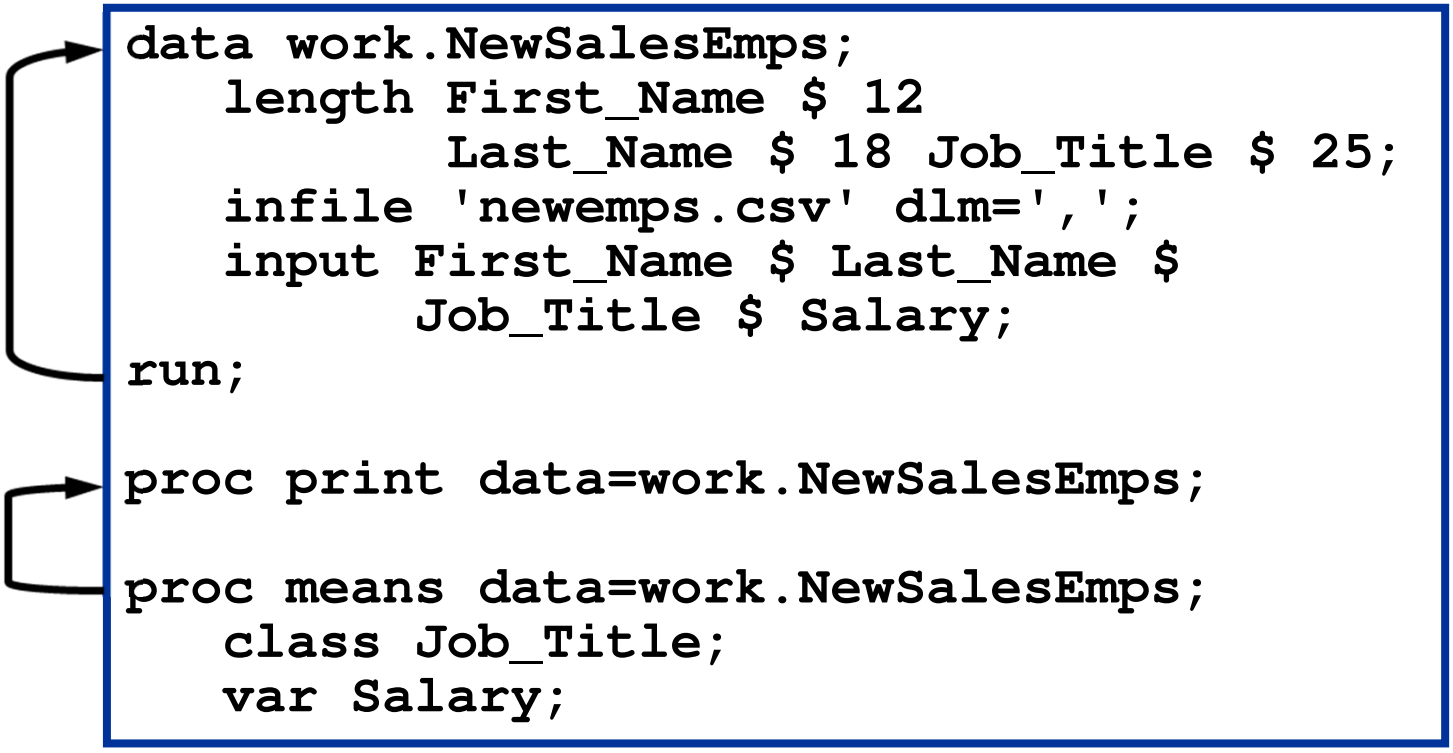
- a DATA statement
- a PROC statement

SAS detects the end of a step when it encounters one of the following:

- a RUN statement (for most steps)
- a QUIT statement (for some procedures)
- the beginning of another step (DATA statement or PROC statement)

Step Boundaries

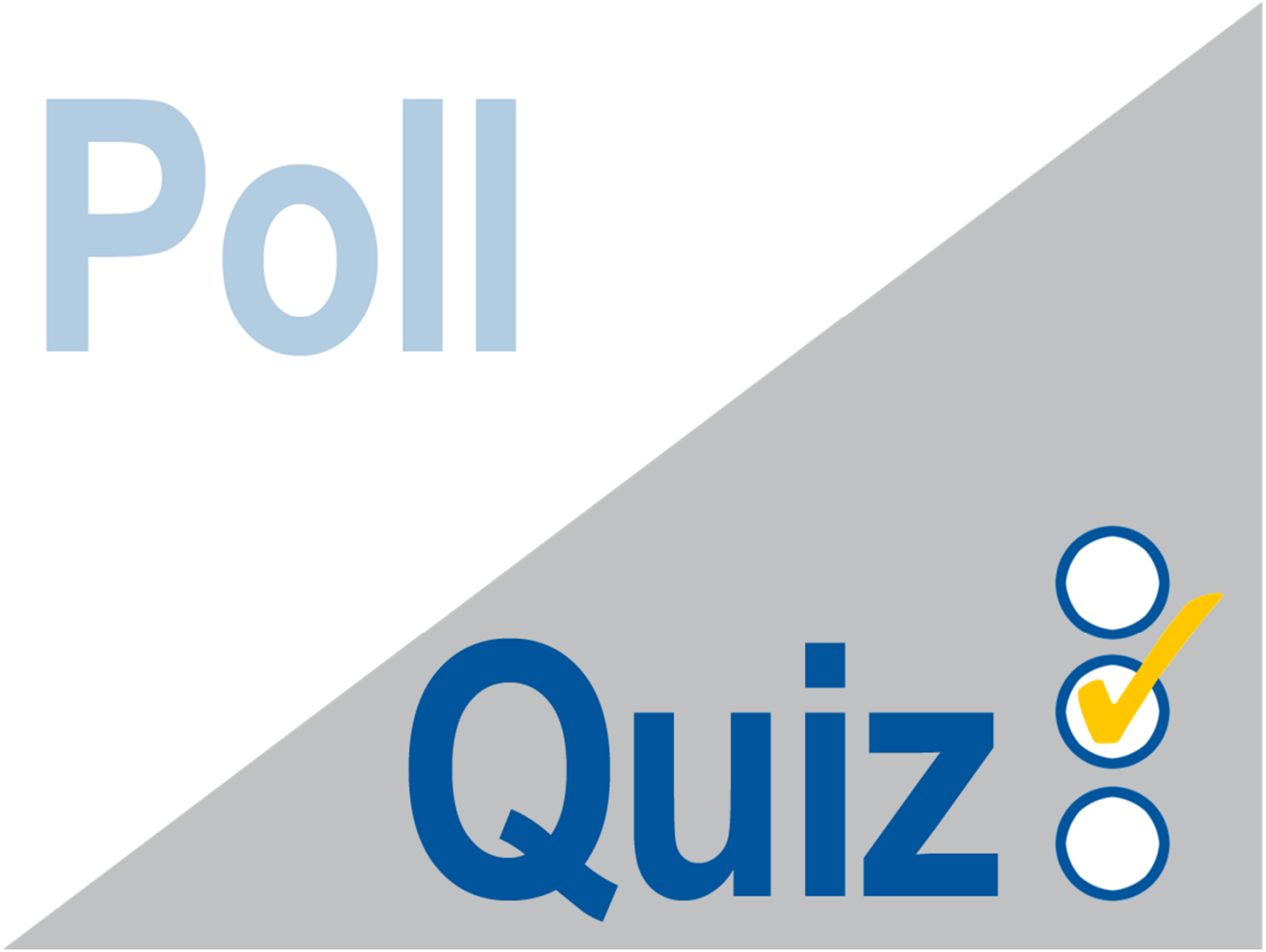
SAS detects the end of the DATA step when it encounters the RUN statement.



```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
```

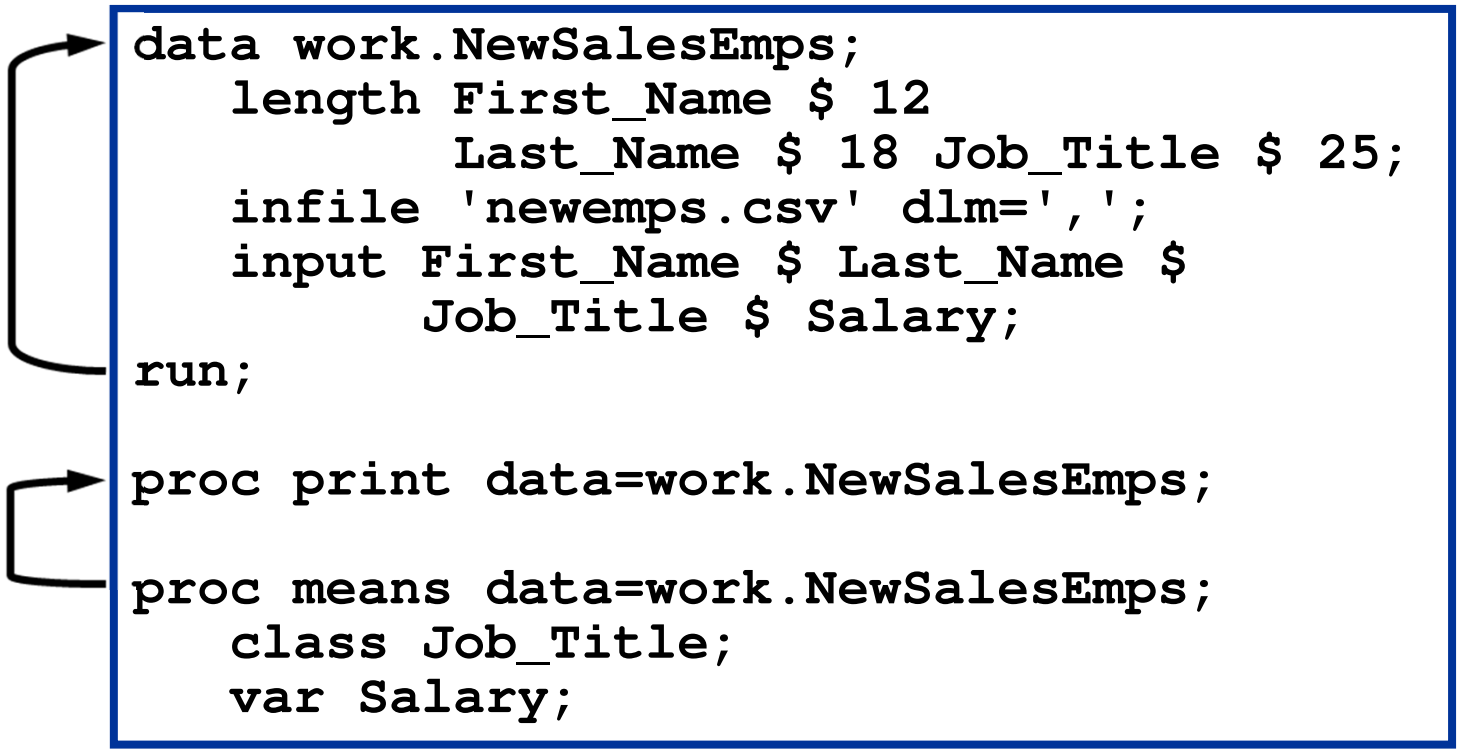
SAS detects the end of the PROC PRINT step when it encounters the beginning of the PROC MEANS step.

Poll



2.02 Quiz

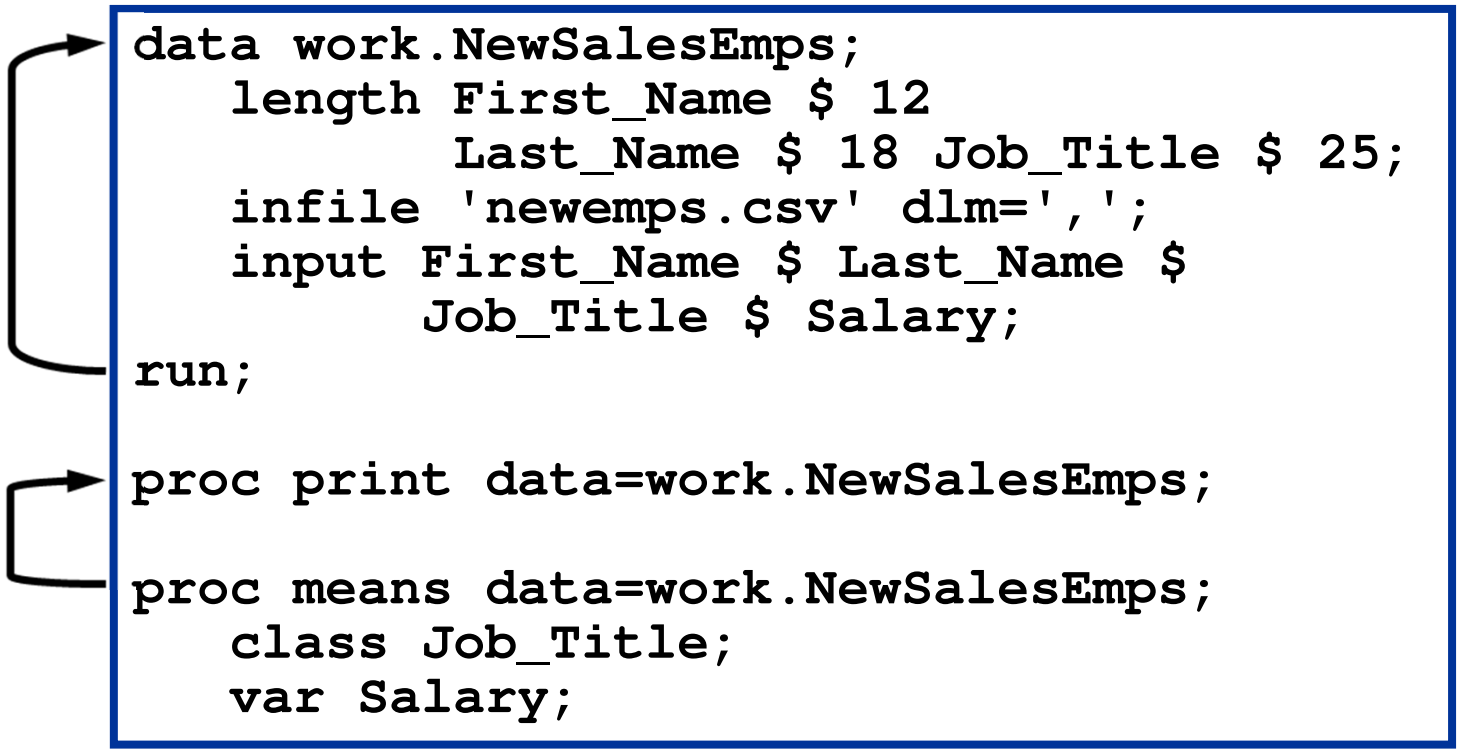
How does SAS detect the end of the PROC MEANS step?



```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
```

2.02 Quiz – Correct Answer

How does SAS detect the end of the PROC MEANS step?

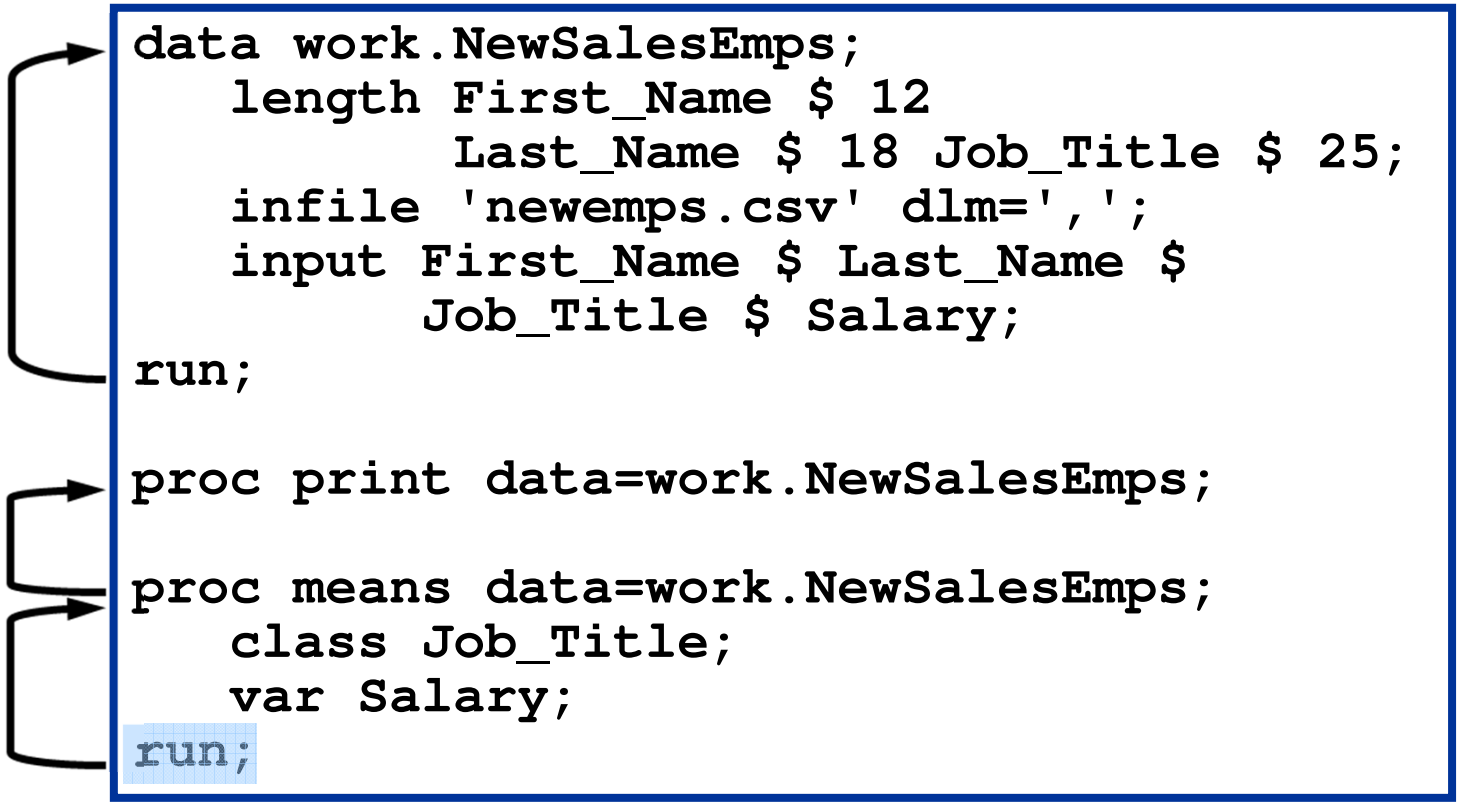


```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
```

SAS does not detect the end of the PROC MEANS step. SAS needs a RUN statement to detect the end.

Step Boundaries

SAS detects the end of the PROC MEANS step when it encounters the RUN statement.



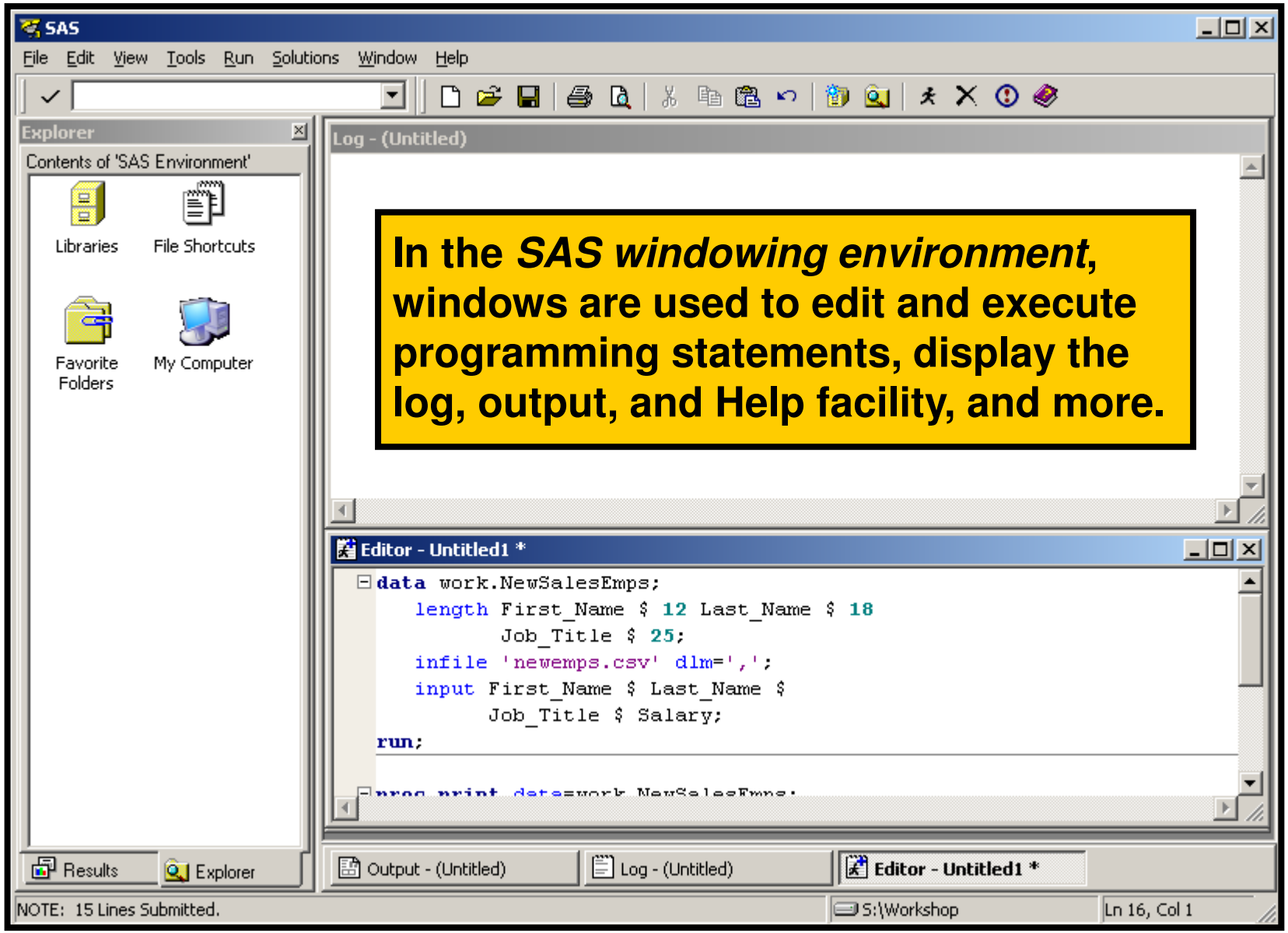
```
data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;

proc means data=work.NewSalesEmps;
   class Job_Title;
   var Salary;
run;
```

Running a SAS Program

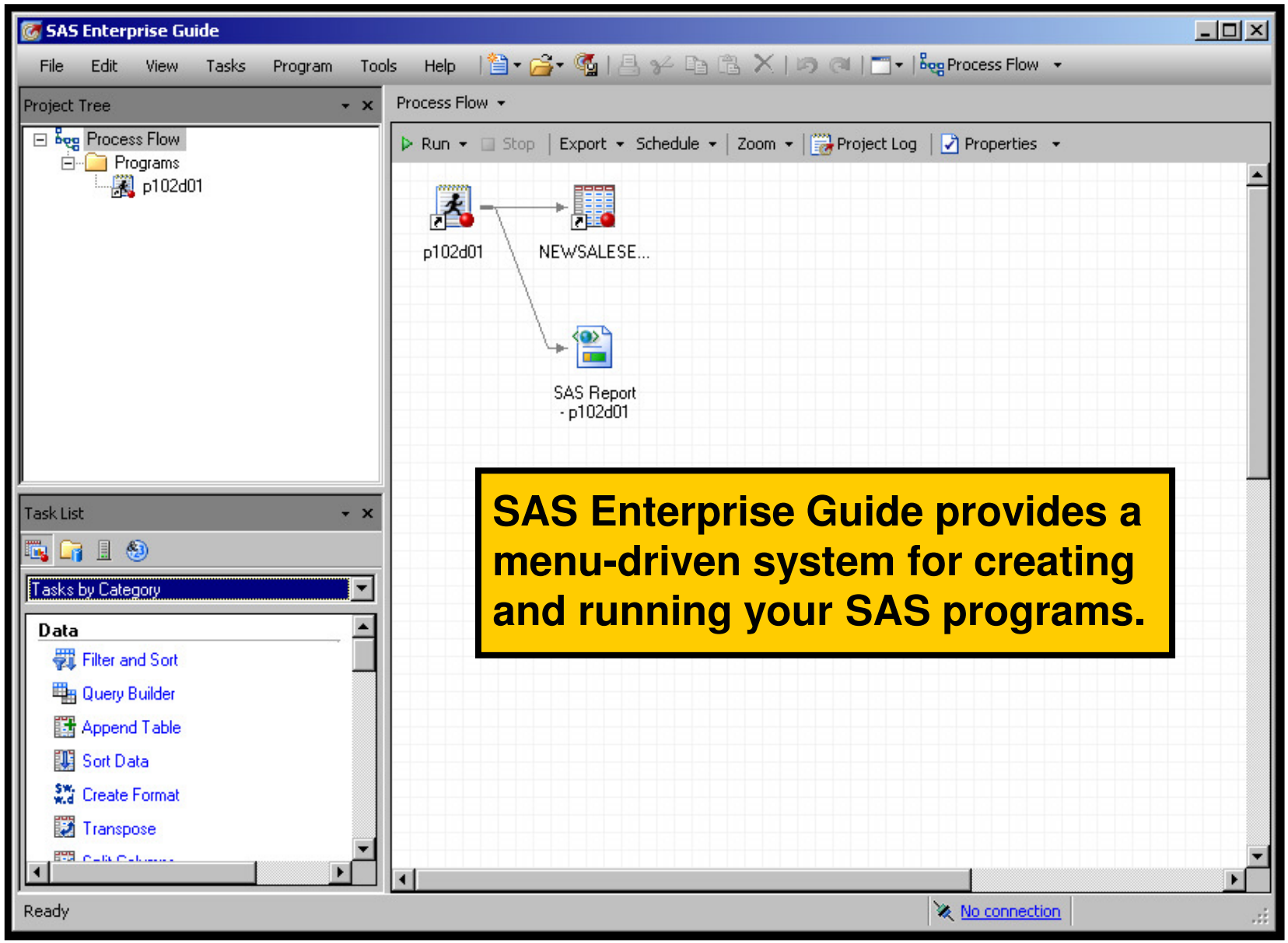
You can invoke SAS in the following ways:

- interactive mode (for example, SAS windowing environment and SAS Enterprise Guide)
- batch mode
- noninteractive mode

SAS Windowing Environment



SAS Enterprise Guide



Batch Mode

Batch mode is a method of running SAS programs in which you prepare a file that contains SAS statements plus any necessary operating system control statements and submit the file to the operating system.

Partial z/OS (OS/390) Example:

```
//jobname JOB accounting info,name …
// EXEC SAS
//SYSIN DD *

data work.NewSalesEmps;
   length First_Name $ 12
          Last_Name $ 18 Job_Title $ 25;
   infile '.workshop.rawdata(newemps)' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;
```

Appropriate JCL is placed before SAS statements.

Noninteractive Mode

In *noninteractive mode*, SAS program statements are stored in an external file and are executed immediately after you issue a SAS command referencing the file.

Directory-based Example:

```
SAS filename
```

z/OS (OS/390) Example:

```
SAS INPUT(filename)
```


Poll
Quiz

2.03 Multiple Answer Poll

Which mode(s) will you use for running SAS programs?

a. SAS windowing environment
b. SAS Enterprise Guide
c. batch mode
d. noninteractive mode
e. other
f. unknown

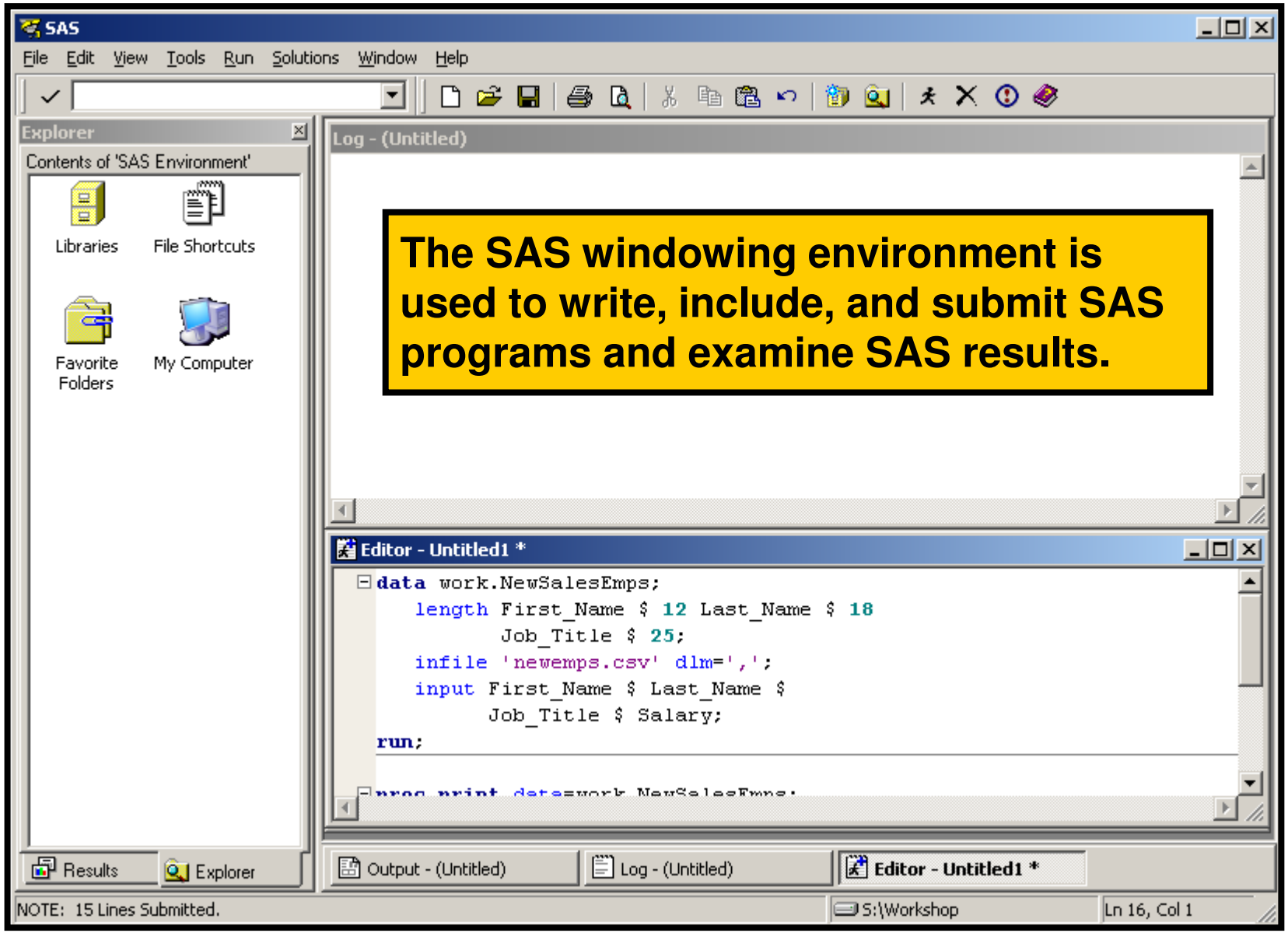

Question
&
Answer

Chapter 2: Getting Started with SAS

Objectives

- Include a SAS program in your session.
- Submit a program and browse the results.
- Navigate the SAS windowing environment.
- Navigate SAS Enterprise Guide.

SAS Windowing Environment



Three Primary Windows

In the SAS windowing environment, you submit and view the results of a SAS program using three primary windows.

	contains the SAS program to submit.
	contains information about the processing of the SAS program, including any warning and error messages.
	contains reports generated by the SAS program.

Editor Windows

Enhanced Editor 	Program Editor 
Only available in the Windows operating environment	Available in all operating environments
Default editor for Windows operating environment	Default editor for all operating environments except Windows
Multiple instances of the editor can be open at one time	Only one instance of the editor can be open at one time
Code does not disappear after it is submitted	Code disappears after it is submitted
Incorporates color-coding as you type	Incorporates color-coding after you press ENTER

Editor Windows

p102d01.sas

```
data work.NewSalesEmps;
   length First_Name $ 12 Last_Name $ 18
          Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;
```

Enhanced Editor

Program Editor - p102d01.sas

```
data work.NewSalesEmps;
   length First_Name $ 12 Last_Name $ 18
          Job_Title $ 25;
   infile 'newemps.csv' dlm=',';
   input First_Name $ Last_Name $
         Job_Title $ Salary;
run;

proc print data=work.NewSalesEmps;
```

Program Editor

Log Window

Partial SAS Log

```
33   data work.NewSalesEmps;
34      length First_Name $ 12 Last_Name $ 18
35             Job_Title $ 25;
36      infile 'newemps.csv' dlm=',';
37      input First_Name $ Last_Name $
38            Job_Title $ Salary;
39   run;

NOTE: The infile 'newemps.csv' is:
      File Name=S:\Workshop\newemps.csv,
      RECFM=V,LRECL=256

NOTE: 71 records were read from the infile 'newemps.csv'.
      The minimum record length was 28.
      The maximum record length was 47.
NOTE: The data set WORK.NEWSALESEMPS has 71 observations and 4 variables.

40
41   proc print data=work.NewSalesEmps;
42   run;

NOTE: There were 71 observations read from the data set WORK.NEWSALESEMPS.
```

Output Window

Partial PROC PRINT Output

Obs	First_Name	Last_Name	Job_Title	Salary
1	Satyakam	Denny	Sales Rep. II	26780
2	Monica	Kletschkus	Sales Rep. IV	30890
3	Kevin	Lyon	Sales Rep. I	26955
4	Petrea	Soltau	Sales Rep. II	27440
5	Marina	Iyengar	Sales Rep. III	29715
6	Shani	Duckett	Sales Rep. I	25795
7	Fang	Wilson	Sales Rep. II	26810
8	Michael	Minas	Sales Rep. I	26970
9	Amanda	Liebman	Sales Rep. II	27465
10	Vincent	Eastley	Sales Rep. III	29695
11	Viney	Barbis	Sales Rep. III	30265
12	Skev	Rusli	Sales Rep. II	26580
13	Narelle	James	Sales Rep. III	29990
14	Gerry	Snellings	Sales Rep. I	26445
15	Leonid	Karavdic	Sales Rep. II	27860

Output Window

PROC MEANS Output

The MEANS Procedure

Analysis Variable : Salary

Job_Title	N Obs	N	Mean	Std Dev	Minimum	Maximum
Sales Rep. I	21	21	26418.81	713.1898498	25275.00	27475.00
Sales Rep. II	9	9	26902.22	592.9487283	26080.00	27860.00
Sales Rep. III	11	11	29345.91	989.4311956	28025.00	30785.00
Sales Rep. IV	6	6	31215.00	545.4997709	30305.00	31865.00
Temp. Sales Rep.	24	24	26265.83	732.6480659	25020.00	27480.00


Poll
Quiz

2.04 Multiple Answer Poll

Which operating environment(s) will you use with SAS?

a. Windows
b. UNIX
c. z/OS (OS/390)
d. other
e. unknown

Submitting a SAS Program

This demonstration illustrates how to include and submit a SAS program, browse the log and output, and use the Help facility using the following interactive modes:

- SAS Windowing Enviornment – Windows
- SAS Windowing Enviornment – UNIX
- SAS Windowing Enviornment – z/OS (OS/390)
- SAS Enterprise Guide

p102d01


Question
&
Answer

Exercise

This exercise reinforces the concepts discussed previously.

Chapter Review

1. What are the two components of a SAS program?

2. In which modes can you run a SAS program?

3. How can you include a program in the SAS windowing environment?

4. How can you submit a program in the SAS windowing environment?

5. What are the three primary windows in the SAS windowing environment?

Chapter Review Answers

1. What are the two components of a SAS program?
   DATA step and PROC step

2. In which modes can you run a SAS program?
   Batch, noninteractive, and interactive modes

3. How can you include a program in the SAS windowing environment?
   INCLUDE command, File ⇨ Open, or 

4. How can you submit a program in the SAS windowing environment?
   SUBMIT command, Run ⇨ Submit, or 

continued...

Chapter Review Answers

5. What are the three primary windows in the SAS windowing environment?

   LOG, OUTPUT, and EDITOR windows