

Intro to SAS

Clay Ford

UVa StatLab

About the workshop

Assumptions

- No prior knowledge of SAS
- Access to SAS

Teach you how to...

- Load data into SAS
- Do basic data manipulation, graphing and statistical analyses
- Navigate SAS documentation

About SAS

- SAS is actually the name of the company. They sell many products.
- This workshop introduces the product SAS 9.4, but should be fine for earlier versions, such as 9.3 or 9.2
- Available for Windows and Linux
- At UVa, obtain from ITS or access through the Hive
- If not at UVa or institution that provides SAS, try SAS University Edition (free but with restrictions)
- Programming Certifications available from SAS

How SAS 9.4 works

- SAS 9.4 is not interactive and has no graphical user interface (GUI); you must write a SAS program to do something
- Typical usage
 - Write a SAS program (usually a few lines)
 - Highlight code and click the “running man”, or press F8
 - Inspect the log for warnings or errors
 - Review the output, if any expected
 - Repeat as needed
- SAS programs can also be run in “batch mode” but we won’t cover this

Two basic parts to a SAS program

- DATA step
 - Read, generate and/or modify data
 - Create a SAS data set
- PROC step (PROC is short for “procedure”)
 - Perform analyses and/or generate graphs
 - Output results
- Most SAS programs start with a DATA step that prepares data for a PROC step

Example SAS Program

```
example_program.sas *  
1  *example program;  
2  
3  data grades;  
4      input name $ grade;  
5      datalines;  
6  Clay 89  
7  Michele 99  
8  Chelsea 94  
9  ;  
10 run;  
11  
12 proc means data=grades;  
13     var grade;  
14 run;
```

SAS Programming Conventions

- End every line with a semicolon (`;`)
- Not case-sensitive (*NAME=Name=name=nAmE*)
- SAS programs end with `.sas` extension
- A SAS program is just a text file
- SAS data sets end with a `.sas7bdat` extension
- Add comments between `*...;` or `/*...*/`
- End DATA and PROC steps with `run;`
- Turn on **Show line numbers** in **Tools -> Options -> Enhanced Editor**

The SAS Environment

You typically work with four windows:

1. The editor
2. The log
3. The results
4. The results viewer

SAS program and log

The screenshot displays the SAS software interface. On the left is the 'Results' pane, which contains a tree view with 'Results' and 'Means: The SAS System'. The main window is divided into two panes. The top pane, titled 'Log - (Untitled)', shows the execution log for a SAS program. The log includes the following text:

```
cpu time          0.01 seconds

9  ;
10 run;
11
12 proc means data=grades;
13     var grade;
14 run;
```

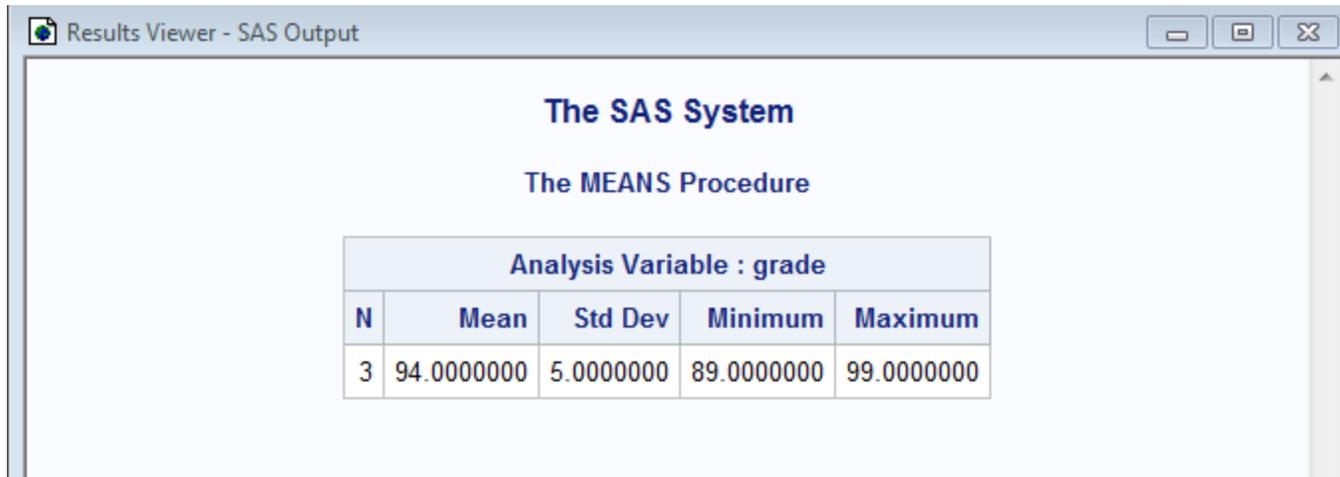
NOTE: Writing HTML Body file: sashtml.htm
NOTE: There were 3 observations read from the data set WORK.GRADES.
NOTE: PROCEDURE MEANS used (Total process time):
real time 0.37 seconds
cpu time 0.26 seconds

The bottom pane, titled 'example_program.sas', shows the source code of the program:

```
1  *example program;
2
3  data grades;
4     input name $ grade;
5     datalines;
6  Clay 89
7  Michele 99
8  Chelsea 94
9  ;
10 run;
```

The taskbar at the bottom shows the 'Results' and 'Explorer' icons, and the taskbar includes tabs for 'Log - (Untitled)', 'example_program.sas', and 'Results Viewer - SAS Ou...'. The system tray shows the user name 'C:\Users\jcf2d'.

SAS results viewer



The screenshot shows a window titled "Results Viewer - SAS Output". The content is centered and reads "The SAS System" followed by "The MEANS Procedure". Below this, a table is displayed for the "Analysis Variable : grade". The table has five columns: N, Mean, Std Dev, Minimum, and Maximum. The data row shows N=3, Mean=94.0000000, Std Dev=5.0000000, Minimum=89.0000000, and Maximum=99.0000000.

| Analysis Variable : grade | | | | |
|---------------------------|------------|-----------|------------|------------|
| N | Mean | Std Dev | Minimum | Maximum |
| 3 | 94.0000000 | 5.0000000 | 89.0000000 | 99.0000000 |

Handy SAS hot keys

- Select text from start of block: **Shift + Down Arrow**
- Submit highlighted code (ie, run code): **F8**
- Wrap selection (or current line) in a comment: **Ctrl + /**
- Unwrap selection (or current line) from a comment: **Ctrl + Shift + /**
- Convert selected text to upper case: **Ctrl + Shift + U**
- Convert selected text to lower case: **Ctrl + Shift + L**
- Go to line: **Ctrl + G** (prompts for a line number)
- Clear log or results viewer: **Ctrl + E**
- To start a new SAS Program: **Ctrl + N**

Let's go to SAS

I have written a SAS file for today's workshop:

```
intro_to_sas_workshop.sas
```

This allows you to reproduce what I have already done in SAS.

To follow along, simply highlight SAS code as we get to it and hit **F8** (or click the running man)

Feel free to add comments or modify the program.

Let's go to SAS!

Getting Help/Going Further

Google!

Books

Learning SAS by Example (Cody)

The Little SAS Book (Delwiche & Slaughter)

Statistical Programming in SAS (Bailer)

Web Sites

<http://www.ats.ucla.edu/stat/sas/>

<http://support.sas.com/training/tutorial/>

UVa StatLab

Thanks for coming today!

For help and advice with statistical analysis, contact the StatLab to set up an appointment: statlab@virginia.edu

Sign up for more workshops or see past workshops:

<http://data.library.virginia.edu/statlab/>

Register for the Research Data Services newsletter to stay up-to-date on StatLab events and resources:

<http://data.library.virginia.edu/newsletters/>