

Brief Introduction to SAS

1. What is SAS?

- Developed in the early 1970s at North Carolina State University
- Originally intended for management and analysis of agricultural field experiments
- Now the most widely used commercial statistical software
- Used to stand for “Statistical Analysis System”

2. SAS Products

- Base SAS - data management and basic procedures
- SAS/STAT - statistical analysis
- SAS/GRAPH - presentation quality graphics
- SAS/OR - Operations research
- SAS/ETS - Econometrics and Time Series Analysis
- SAS/IML - interactive matrix language
- SAS/AF - applications facility (menus and interfaces)
- SAS/QC - quality control

3. Basic Structure of SAS

- Two main components - data step and procedure step
- The data step reads data from external sources, manipulates and combines it with other data set and prints reports. The data step is used to prepare your data for use by one of the procedures. The procedure steps perform analysis on the data, and produce (often huge amounts of) output.

4. Some Preliminary Rules

- SAS is not case sensitive.
- Each statement in SAS must end in a semicolon (;).
- Lines beginning with an asterisk (*) are treated as comments. Alternatively you can enclose comments between /* and */.
- Data steps begin with the word `data` and procedure steps begin with the word `proc`.
- The `run;` command signals to SAS that the previous commands can be executed.

SAS Environment

To open SAS, go to: [Start > Programs > SAS > SAS 9.4](#)

SAS will open three windows, **Explorer**, **Log**, and **Editor**.

- **Explorer** is for displaying data sets and **Results** is for displaying result titles. Both Explorer and Results have tree structures so you can click on items to show details.
- The **log** window is where SAS tells you what it is doing. It echoes your instructions and displays errors, warnings, and informational messages.
- **Editor** is where you write and execute the commands. The SAS Enhanced Editor has nice features such as color coding and separation lines. The commands you type will not be executed until you submit them to SAS. Click on the icon with a person running to run the program.

Inputting Data

1. Use statement `cards;` or `datalines;` to read from inline data

```
data grade;                /* grade is SAS data set name */
input name$ grade;         /* name is a character variable so use $ */
cards;                     /* (or datalines;) specify inline data */
Ben 3.6                    /* following are actual records */
Mike 2.8
Susan 3.1
Jessica 4.0
...
;
run;                       /* the end of data step and asks SAS to run it */
```

2. Use `infile` statement to read data from an external text file

```
data grade2;
infile 'C:\Stat481\grade.dat'; /* directory and file name */
input name$ grade;
run;
```

3. Use `proc import` to read in an Excel file. Provide a name for your data by using command `out=DataName`

```
proc import datafile='C:\Stat481\grade.xls' out=grade3 replace;
run;
```

Data Manipulation

1. Combine or merge data
2. Sort data: `proc sort`
3. Print data: `proc print`

Statistical Analysis

1. Descriptive Statistics: `proc means`
2. Distribution Summary: `proc univariate`
3. T-test: `proc ttest`
4. Analysis for categorical data: `proc freq`

Help Resource

1. SAS Base help manual:
<http://support.sas.com/documentation/cdl/en/basess/68381/PDF/default/basess.pdf>
2. SAS Procedures and Products:
<http://support.sas.com/documentation/cdl/en/allprodsproc/63875/HTML/default/viewer.htm#a003135046.htm>
3. UCLA Online SAS Help Site: >> [Links by Topic](http://www.ats.ucla.edu/sat/sas/)
<http://www.ats.ucla.edu/sat/sas/>
4. Dr. Brian Yandell's Introduction to SAS:
<http://www.stat.wisc.edu/~yandell/software/sas/intro.html>
5. [*My Little SAS Book*](#) by Lora Delwiche and Susan Slaughter.

Resources for the brief doc:

1. <http://www.stat.berkeley.edu/~spector/s100/sas.pdf>
2. <http://julius.csscr.washington.edu/pdf/sas.pdf>