

SAS Components



- **This class**
 - Base SAS – basic procedures and data management
- **SAS has over 200 components, including**
 - SAS/STAT – statistical analysis
 - SAS/GRAPH – high quality graphics & presentations
 - SAS/ACCESS – reads data directly from databases
 - SAS/ETS – econometrics and time series
 - SAS/INSIGHT – data mining
 - SAS/QC – quality control
 - SAS/PH – clinical trials

Applications



- Why are we using it?
- What are some of the applications?
 - Statistical analysis
 - Data management
 - Creating reports

Today's Objectives

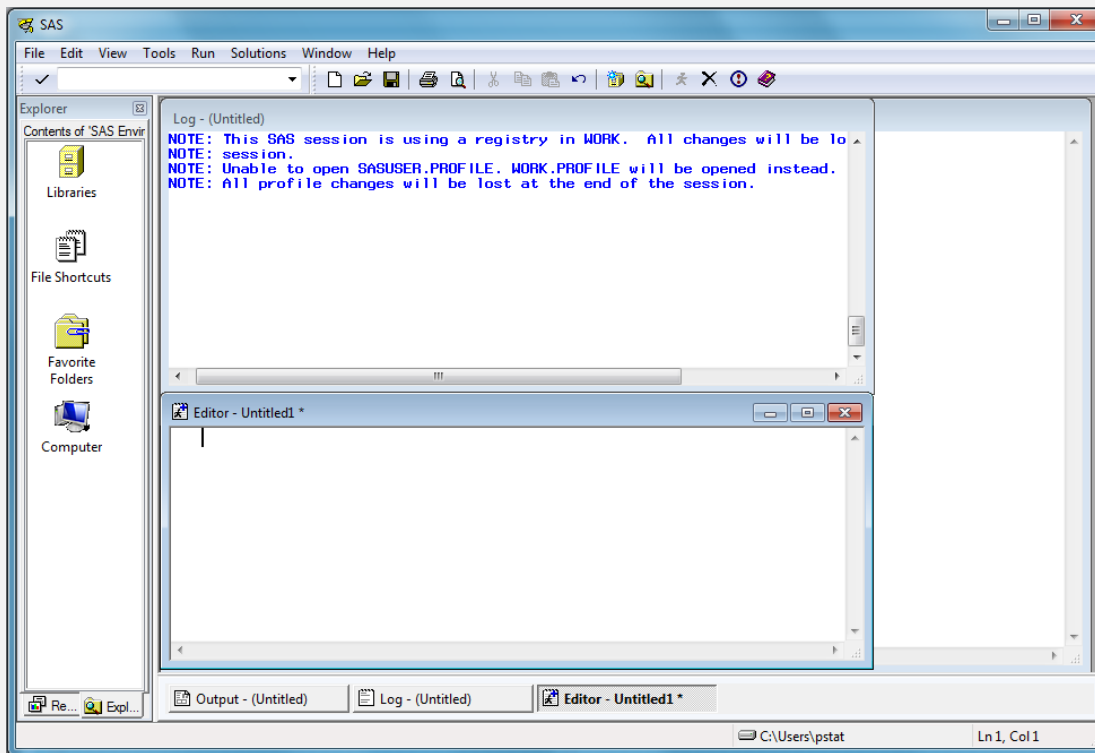


- Open the program
- Learn how to navigate the program
- Learn some basic syntax
- Create our first SAS program!

First Step



- Open SAS
 - Menu -> All Programs -> Math & Stats -> SAS -> SAS 9.4

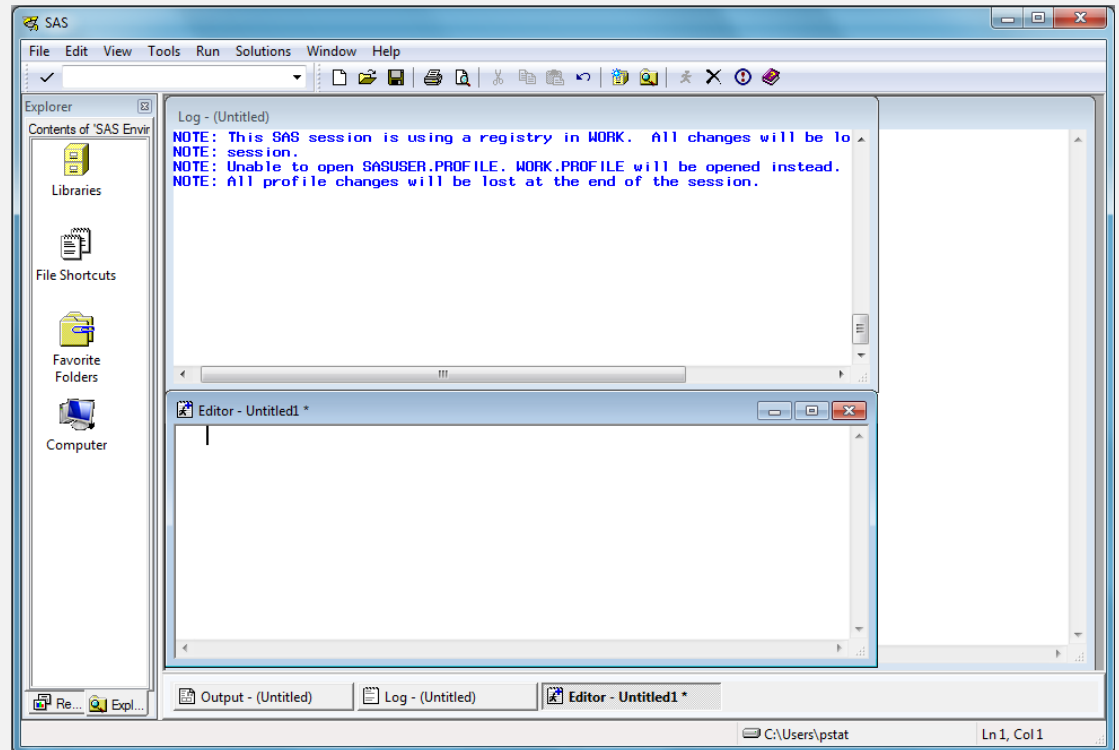


The Main Windows



- Five Main Windows

- Editor
- Log
- Output
- Results
- Explorer



Editor



- Edit, execute, and save SAS programs

A screenshot of the SAS Editor window. The window has a title bar with the text "ex1 *" and standard Windows window controls (minimize, maximize, close). The main area contains SAS code. The first part is a DATA step: "data objectives;" followed by "input topics \$ minutes;" and "datalines;". Below this are several lines of data: "intro 5", "syllabus 10", "windows 5", "steps 5", "library 10", "print 20", "syntax 5", and "quiz 5". This is followed by a semicolon ";" and the word "run;". The second part of the code is a PROC PRINT step: "proc print;" followed by "run;". The bottom of the window shows a taskbar with three tabs: "Output - (Untitled)", "Log - (Untitled)", and "ex1 *".

```
data objectives;
  input topics $ minutes;
  datalines;
intro 5
syllabus 10
windows 5
steps 5
library 10
print 20
syntax 5
quiz 5
;
run;
proc print;
run;
```

Log



- Displays status messages regarding the execution of SAS procedures

A screenshot of the SAS Log window, titled "Log - tmp". The window displays the following text:

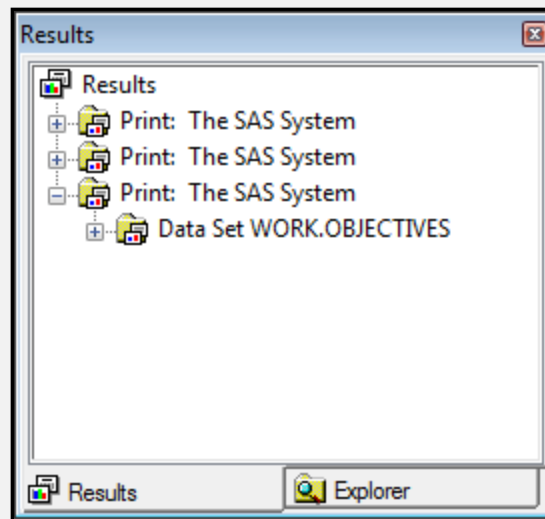
```
1  data objectives;  
2      input topics $ minutes;  
3      datalines;  
  
NOTE: The data set WORK.OBJECTIVES has 8 observations and 2 variables.  
NOTE: DATA statement used (Total process time):  
      real time           0.21 seconds  
      cpu time            0.01 seconds  
  
12 ;  
13 run;  
14 proc print;  
NOTE: Writing HTML Body file: sashtml.htm  
15 run;  
  
NOTE: There were 8 observations read from the data set WORK.OBJECTIVES.  
NOTE: PROCEDURE PRINT used (Total process time):  
      real time           1.79 seconds  
      cpu time            0.45 seconds
```

The window has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the log window, the taskbar shows four open applications: "Output - (Untitled)", "Log - tmp" (which is the active window), "ex1 *", and "Results Viewer - sasht...".

Results



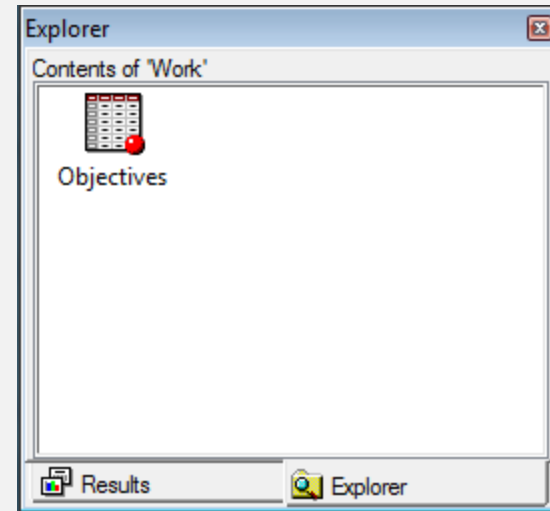
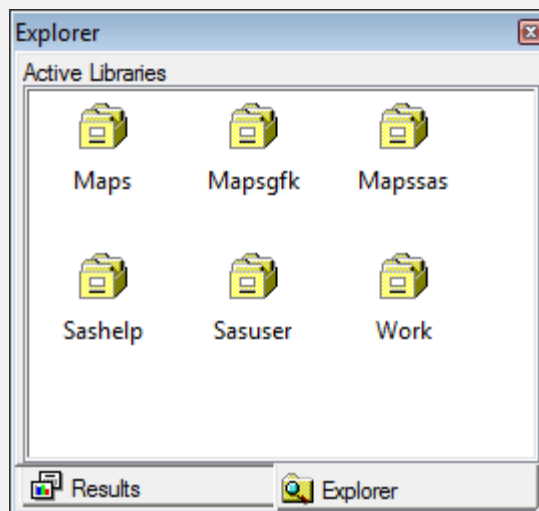
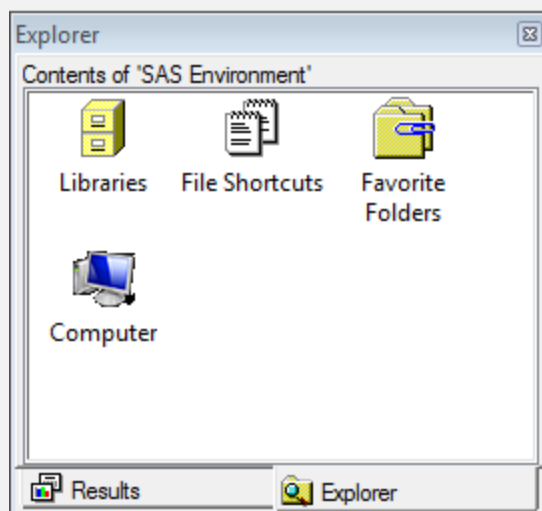
- Displays links to previously executed results



Explorer



- Navigate libraries, data sets, and other SAS objects



Output + Results Viewer



- Output window:

The SAS System			13:49 Wednesday, March 18, 2015		1
Obs	topics	minutes			
1	intro	5			
2	syllabus	10			
3	windows	5			
4	steps	5			
5	library	10			
6	print	20			
7	syntax	5			
8	quiz	5			

- Results viewer

- Default output for SAS 9.4
- A single, continuous html report
- Not affected by options like
 - ✦ Page size, page number, etc.

The SAS System		
Obs	topics	minutes
1	intro	5
2	syllabus	10
3	windows	5
4	steps	5
5	library	10
6	print	20
7	syntax	5
8	quiz	5

Another Useful Window: Table Editor

A screenshot of a software window titled "VIEWTABLE: Work.Objectives". It contains a table with two columns: "topics" and "minutes". The table has 8 rows of data. The window has standard Windows-style controls (minimize, maximize, close) in the top right corner.

	topics	minutes
1	intro	5
2	syllabus	10
3	windows	5
4	steps	5
5	library	10
6	print	20
7	syntax	5
8	quiz	5

A screenshot of a software window titled "VIEWTABLE(New): (Untitled)". It contains an empty table with 9 rows and 5 columns labeled A, B, C, D, and E. The window has standard Windows-style controls (minimize, maximize, close) in the top right corner.

	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					

Getting Started



- How to submit/execute a program?

- Make sure the Editor window is active

- ✦ Submitting the entire program

- Run → Submit

- Click on the “running man” symbol in the toolbar



- Command line → Type ‘submit’ and hit Enter

- F8

- ✦ Submitting a portion of the program

- Highlight the portion you’d like to submit

- <right click> → Submit Selection

- F8

Getting Started



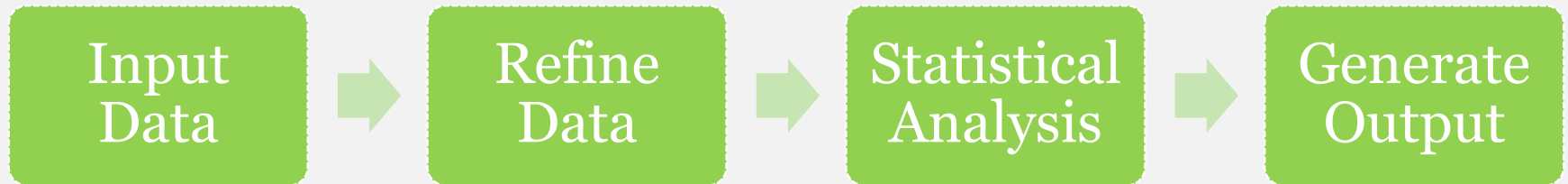
- How to save a program?
 - File → Save
 - Ctrl + S

File Extensions



- What are the file extensions for
 - A SAS program?
 - ✦ .sas
 - A SAS data set?
 - ✦ .sas7bdat
 - A SAS log file?
 - ✦ .log
 - A SAS output file?
 - ✦ .html (by default)

The Basics: SAS Process



The Basics



- **SAS statements**
 - Always begin with a keyword
 - Always end with a semicolon (;)
 - Are free format
 - ✦ i.e. Can begin at any location and end at any location
 - Entire program can be written on one line, or many lines
 - ✦ EXCEPT when using the datalines; statement
- **SAS**
 - Is not case sensitive
 - ✦ i.e. daTa nOtCaseSensitive;
 - ✦ EXCEPT in the case of string comparisons

The Basics



- Names of SAS data sets and variables must
 - Be no longer than 32 characters
 - Begin with a letter or underscore
 - Contain only letters, numbers, or underscores (_)

The Basics



- Comments
 - What are they?
 - Why should we use them?
 - Single line: begin with an asterick (*) and ends with a semicolon (;)
 - Multiple line: begins with a /* and ends with a */

The Basics



- SAS 9.4 has context-sensitive help.
 - Highlight a keyword and press F1

Libraries



- SAS file names always contain 2 levels
 - Level 1: <library-name>
 - Level 2: <data-set-name>
 - ✦ i.e. <library-name>.<data-set-name>
- What does this mean?
 - SAS references folders called libraries when accessing SAS data sets
 - Libraries are simply pointers to folder locations on the disk drive
 - ✦ i.e. 'X:\PStat 130\data1'

Libraries



- SAS has 2 existing libraries:
 - work
 - sasuser
- work
 - Is a temporary library
 - Is the default library
- sasuser
 - Is a permanent library
- All other libraries must be assigned

Libraries

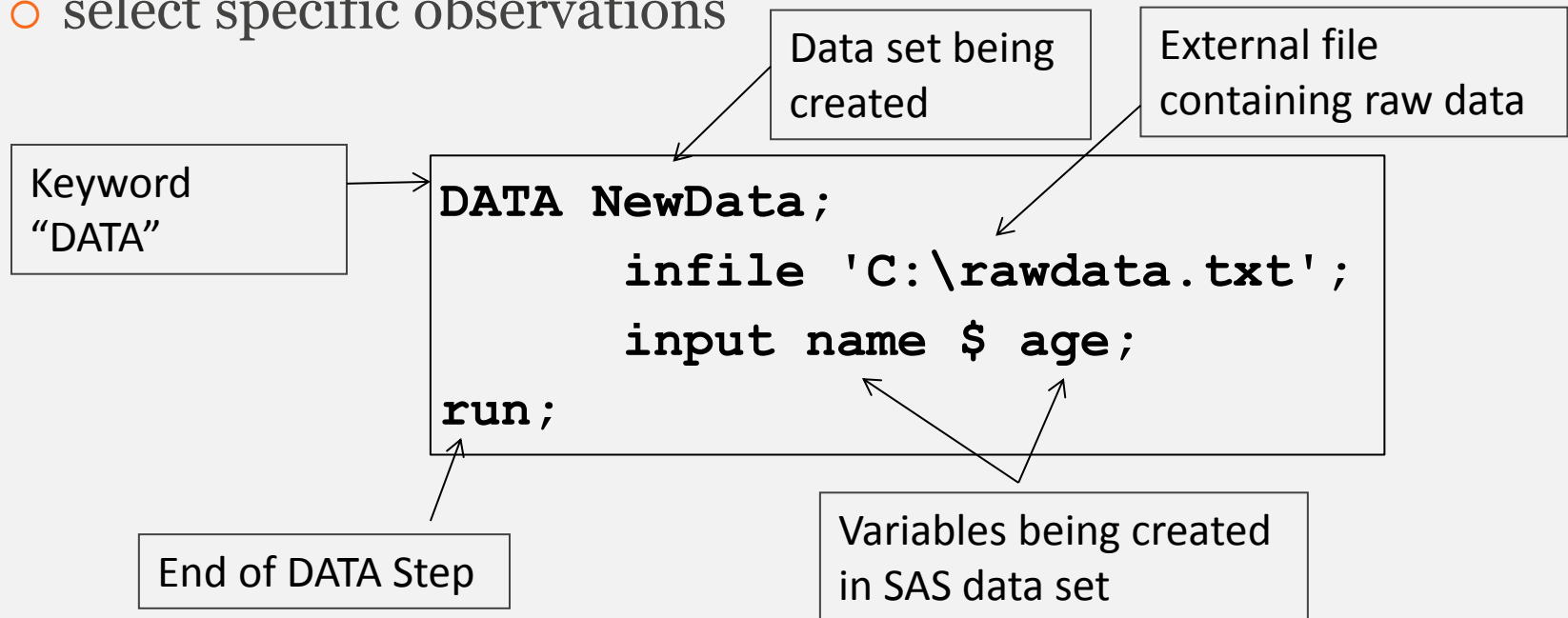


- Library references (libref) must
 - Start with a letter or an underscore
 - Be 8 characters or less
- To define a library, you need
 - The **libname** keyword
 - A user-defined libref name
 - A folder location
- General format:
 - `libname desktop 'C:\desktop';`

The DATA Step



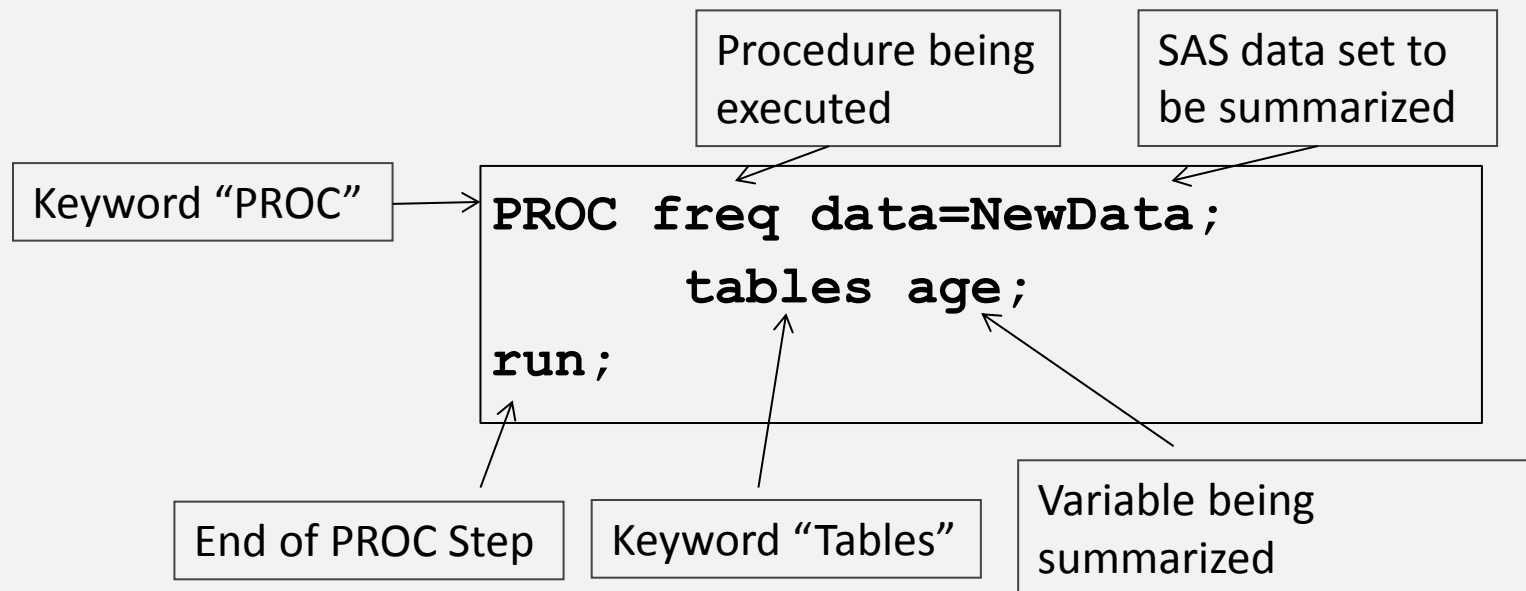
- DATA Step: A set of statements that
 - read in a data file
 - assign variable names, labels, and formats
 - select specific observations



The PROC Step



- PROC Step: A set of statements that
 - perform “utility” operations on a data set
 - analyze data
 - output results or reports



First SAS Program



```
DATA intelligence;
```

```
    input IQ;
```

```
datalines;
```

```
99
```

```
140
```

```
125
```

```
118
```

```
104
```

```
;
```

```
run;
```

```
PROC print;
```

```
run;
```

i.e. work.intelligence

Obs	IQ
1	99
2	140
3	125
4	118
5	104

The SAS System		23:08 Tu
Obs	IQ	
1	99	
2	140	
3	125	
4	118	
5	104	