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# Our Experiences with Running SAS Workshops

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‘This book had its origins in 1972, when I noticed that computer novices could begin to use the SAS<sup>®</sup> System productively after ten minutes of explanation.’

Jane T. Helwig in the Preface to the SAS<sup>®</sup> *Introductory Guide, Third Edition*. © 1985.



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# Background

- Started in 1991 (DOS/SAS 6)
- Epidemiology of Health Care
- Training needed for students and staff
- 4-40 students each year
  - Primarily Graduate students from Dept. Community Health Sciences
  - New hires within MCHP





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# Scope

- SAS programming – data step and procedures.
- Focus on data manipulation
- Time – 5 sessions (15 hours in class).
- Programming by example and problems.

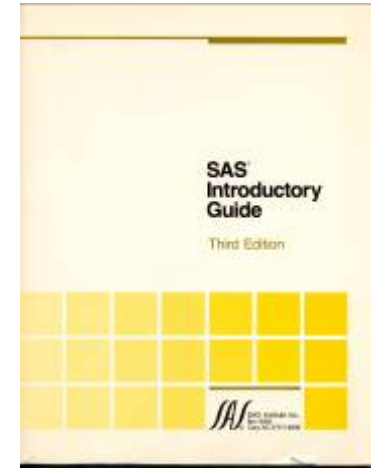




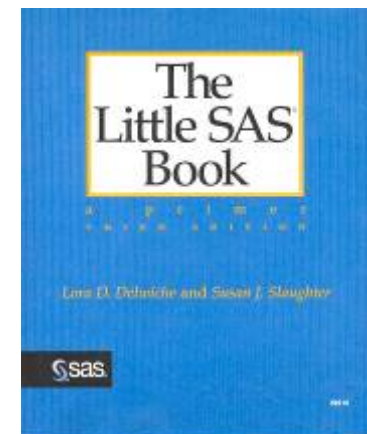
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# Textbooks

- SAS Introductory Guide



- The Little SAS Book: A primer



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# Overview of course

- Basic introduction – Why programming?
- Libraries
- SAS data set
  - Observations, variables.
- Steps
  - Proc
  - Data
- Options





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# Use of Procedures

Exploration	Manipulation
Contents	Sort
Print	Format
Freq	Import/Export
Means	SQL
Univariate	

```
* You can associate a  
* This will associate  
Proc freq data=htwt;  
    tables sex age;  
    format age agegrp  
run;
```

- Concept and typical syntax - Generalize
- Use of online Help





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# Importing Data

## Input of raw data

- Column (fixed format)
- List format
- Delimited
- Input other formats
  - Excel
  - Access
  - Again provide general tools and let users work with documentation.
- Also exporting (proc export/ODS)

```
data htwt; /* Begin the DATA step
           /* Describe variable names
input name $ 1-10 sex $ 12 age
      height 17-18 weight 20-22
           /* Read the following lines
           /*the key word CARDS can be used
           datalines;
Aubrey      M 41 74 170
Ron         M 42 68 166
```





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# Data Step Processing

- Creating new variables
  - Calculations, re-codeing
- Dividing data into multiple datasets
  - If/then/else processing
- Use of functions
- Include use of formats for value labels
- Use of value/invalue formats with put/input functios.





# Combining Data

- Concatenate (Set)
- Merge
- SQL processing also covered briefly (mostly just to say it is there if people know what it is).

```
data concat;
    set course.male_htwt (in=m1)
        course.female_htwt (in=m2);
run;

** Limit data to just those over 30
data mer;
    merge htwt_ov30 (in=m1)
          htwt_wpg (in=m2 rename=(fi
    by name;
    if m1=1 & m2=1 ;    ** Subsetting
run;
```





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# Array Processing

- Creating arrays
- Do loop processing

```
data diab;  
  set course.sim_hosp;
```

```
* In the DATA step, you can put variables  
  using an ARRAY statement. The following  
  DIAG01 through to DIAG10 into an array.  
* Note that SAS allows you to refer to  
  the same prefix with a "-" instead of  
  listing each variable.
```

```
array dx(10) diag01-diag10;
```

```
* To tell SAS to perform the same operation  
  on each element of the array.  
* This statement iterates 10 times.
```

```
finddiab=0;
```

```
* finddiab=1 if there is 1 or more  
  of the following conditions.
```

```
do i=1 to 10;  
  if dx(i)=:'250' then do;  
    finddiab=1;  
  end;  
end;
```

```
if finddiab then output;
```

```
run;
```





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# By Group Processing

- First/Last
- Retain

```
data w_compare(keep=name age index_weight weight)
  set htwt_long;
  by name ;
  retain count index_weight ;
  ** When the first record in the by group is
  encountered, the retained variables are a
  if first.name then do;
    count=0;          *** Why do you
    index_weight = weight ;  *** Assign
  end;
  count=count+1;     ** Counter for
  if last.name ;
run;
```





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# Date and Date/Time

- Dates and Date time Processing

```
data test;
  set course.sim_hosp;

  *** create SAS date variables from character variables
  (LSB s10.8 pp266-267) and SAS Date/Time informat
  sasdateadm = input(dateadm, yymmdd8.);
  sasdatesep = input(datesep, yymmdd8.);

  *** obtain the month of admission from the date variables
  month_adm = month(sasdateadm);
  month_sep = month(sasdatesep);

  datediff = '01mar2004'd - sasdateadm;
  label datediff = 'Number of Days between admission and 01mar2004';
run;
```





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# Graphical Interface

- SAS Explorer
- ViewTable
- Insight
- Analyst

SAS Explorer window showing the contents of 'Admin' directory:

- Atc\_codes
- Drug\_cost
- Hospital
- Physician

VIEWTABLE: Admin.Atc\_codes

	Drug Ident Number this claim	Equivalent Generic F
1	00000299	ERYTHROMYCIN ETHYL
2	00000302	ERYTHROMYCIN STEAR
3	00000396	COLCHICINE
4	00000434	ERYTHROMYCIN STEAR
5	00000655	CARBACHOL
6	00000663	CARBACHOL
7	00000779	HOMATROPINE HYDRO
8	00000787	HOMATROPINE HYDRO

ADMIN.ATC\_CODES

5130	PRODE
1	EES 200 GRANULES FO
2	ERYTHROCIN LIQUID 1
3	COLCHICINE TAB 0.6M
4	ERYTHROCIN FILMTAB
5	ISOPTO CARBACHOL 1.
6	ISOPTO CARBACHOL 3%
7	ISOPTO HOMATROPINE
8	ISOPTO HOMATROPINE
9	ISOPTO TEARS 0.6%
10	ISOPTO TEARS 1.0%
11	ISOPTO CARPINE 0.5%
12	ISOPTO CARPINE LIQ
13	ISOPTO CARPINE LIQ
14	ISOPTO CARPINE LIQ
15	ISOPTO CARPINE LIQ

Distribution 1 ADMIN.ATC\_CODES

DDD

0.1081

Density





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Thank  
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