

STA 402/502 Homework 11

Due: November 26 (Monday), before class

Please read the homework guidelines before working on the homework. Homework that does not follow the guidelines will be deducted points. You are to complete this assignment on your own. Remember to include an intro comment block on all programs written. Each problem should be attempted as its own program.

Do the following exercise and make sure you do not edit the given permanent dataset. Use ODS RTF to save the created tables (as well as corresponding titles) and include them in your homework.

1. Suppose that at a local university the study guidelines for the College of Science and Math are to study two to three hours per unit per week. The instructor of the class, Orientation to the Statistics Major, takes these guidelines very seriously. He asks students to record their study time each week, and at the end of the term he compares their average study time per week to their term GPA. The SAS data set called STUDY_GPA contains student identification information, orientation course section number, number of units enrolled, average time studied, and term GPA.

Write a MACRO program that will input four macro variables from the user: a dataset DS , an X variable, a Y variable and a TITLE . The MACRO will then produce a scatterplot with overlaid regression line using PROC SGPLOT from dataset DS with corresponding X and Y with a proper TITLE . Call this MACRO %plotreg. Demonstrate your MACRO works correctly by using the STUDY_GPA dataset in CANVAS website. with the x-variable corresponding to the average time studied and the y-variable corresponding to the term GPA. Make sure to provide a proper title. Run the macro again where the x-variable corresponds to the number of units enrolled variable (make sure to update the title!).

2. Debugging macros can be tedious, but using SAS system options for debugging macros can help by turning on certain messages that are written to the log. Consider the following SAS program that creates a times table for any dimension specified, in this case 12 by 12.

```
%MACRO tt(NumRows=,NumCols=);  
DATA table (DROP = &NumRows &NumCols);  
ARRAY col(&NumCols) col1 - col&NumCols;  
DO i = 1 TO "&NumRows";  
DO j = 1 TO "&NumCols";  
col(j) = i * j;  
END;  
OUTPUT;  
END;  
RUN;  
PROC PRINT DATA = TABLE;  
TITLE1 'Times Table Printed for';  
TITLE2 '&NumRows by &NumCols';  
TITLE3 "Printed on &sysdate";  
RUN;  
%MEND tt;  
%tt(NumRows = 12,NumCols = 12)
```

- (a) Type this program into the editor and submit it.
- (b) Review the log for any errors and warnings, or any notes that indicate that SAS may have tried to fix your program for you. Add a comment to your program about the messages that you found in the log.
- (c) Add two options to your program so that the log will display the standard code that is generated by macros and the values of the macro variables.
- (d) Run the program again and review the log. Fix the issues that you identified. Change the label of the variables to be 1, 2, ... (make sure it works if you change the number of columns), and run the edited program. Also check and make appropriate change to the title statements to make sure the title is shown appropriately. The following shows an example of an 8 by 8 times table.

Table 1: An 8 by 8 times table template

Obs	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8
2	2	4	6	8	10	12	14	16
3	3	6	9	12	15	18	21	24
4	4	8	12	16	20	24	28	32
5	5	10	15	20	25	30	35	40
6	6	12	18	24	30	36	42	48
7	7	14	21	28	35	42	49	56
8	8	16	24	32	40	48	56	64

3. Use the manatees dataset introduced in Chapter 5 of the textbook (page 157). Work on exercise #2 in Exercise 5.7 (page 195) of the SAS text, using output data sets from PROC REG to prepare material displayed by SGPLOT.
4. Multiple Choice Questions (2pt for each question, you may just provide the answer.)

(a) Given the SAS data set SASUSER.HIGHWAY:

```
Steering Seatbelt Speed Status Count
-----
absent No 0-29 serious 31
absent No 0-29 not 1419
absent No 30-49 serious 191
absent no 30-49 not 2004
absent no 50+ serious 216
```

The following SAS program is submitted:

```
%macro SPLIT;
proc sort
data=SASUSER.HIGHWAY
out=WORK.UNIQUES(keep=Status)
nodupkey;
by Status;
run;

data _null_;
set uniques end=Lastobs;
```

```

call symputx('Status' || left(_n_), Status);
if Lastobs then call symputx('Count', _n_);
run;

data
%do i=1 %to &count;
[_insert_reference_]
%end;
;
set SASUSER.HIGHWAY;
select(Status);
%do i=1 %to &Count;
when("[_insert_reference_]") output [_insert_reference_];
%end;
otherwise;
end;
run;
%mend;

```

%SPLIT

What macro variable reference completes the program to create the WORK.NOT and WORK.SERIOUS data sets?

- A. &Status&i
- B. &&Status&i
- C. &Status&Count
- D. &&Status&Count

(b) The following SAS program is submitted:

```

%let product=merchandise;
[_insert_%put_statement_]

```

and the following message is written to the SAS log: the value is "merchandise" Which macro statement wrote this message?

- A. %put the value is "&product.";
- B. %put the value is %quote(&product.);
- C. %put the value is "&product.";
- D. %put the value is "&product.";

(c) The following SAS program is submitted:

```
%macro CHECK(Num=4);
%let Result=%sysevalf(&Num gt 5);
%put Result is &result;
%mend;
%check(Num=10)
```

What is written to the SAS log?

- A. Result is 0
- A. Result is 1
- C. Result is 10 gt 5
- D. Result is true

(d) The following SAS program is submitted:

```
%let Mv=shoes;
%macro PRODUCT(Mv=bicycles);
%let Mv=clothes;
%mend;
%PRODUCT(Mv=tents)
%put Mv is &Mv;
```

What is written to the SAS log?

- A. Mv is bicycles
- B. Mv is clothes
- C. Mv is shoes
- D. Mv is tents

(e) The following SAS program is submitted:

```
%macro execute;
[_insert_statement_here_]
proc print data=SASUSER.HOUSES;
run;
%end;
%mend execute;
```

```
%execute
```

Which statement completes the program so that the PROC PRINT step executes on Thursday?

- A. if &sysday = Thursday then %do;
- B. %if &sysday = "Thursday" %then %do;

- C. `%if "&sysday" = Thursday %then %do;`
- D. `%if &sysday = Thursday %then %do;`