Statistics 147: IN-CLASS PRACTICE #2

Summer 2019; 10 pts

NAME: Wesley Chang **ID: (last 4 digits only)** 0996

GOAL: (In class practice) Getting more acquainted with **Do Loops**.

To invoke SAS, double-click on the **SAS** icon on the desktop.

RECALL: You will type your program in the **Program Editor** window

1. Suppose we would like to calculate:

$$y = 0.5xe^{0.5x}, \qquad x = 1, 3, 5, 7, 9$$

NOTE: exp function raises e to the indicated power. For example, exp(x) yields e^x.

Write the appropriate SAS program code to calculate the values.

```
/* Set up format of the output */
options nocenter ps = 55 nocenter ls = 78 nodate nonumber formdlim='*';
 /* ls = linesize,  ps = pagesize
           nocenter      justifies the output so it is not centered on the page
           nodate        suppresses printing of today's date on each page of output
           nonumber      suppresses printing of page number on each page of output
           formdlim      overrides the internal page breaks and replaces them
                            with the designated symbol*/


/* Use DM to clear all windows except the editor window */

DM log "odsresults; clear; out; clear; log; clear;";

ods graphics off;

/* goptions   formats the plot
                    cback    color of the plot background
                    colors   colors to use
                    ftitle   font of the plot title
                    ftext    font of the text in the plot (except the title)
                    htitle   height of the title
                    htext    height of text on the plot (except the title)
*/
goptions reset = all colors= (blue,red,green,purple)
       ftitle = swissb ftext=swissb htitle=3;
```

```
title1 'Statistics 147 SAS Practice 2';
title2 'My First Do Loop';
title3 'Your name goes here';

/* Set up temporary SAS dataset */
data tryloop1;
    /* Set up the loop
       format: do start to stop by increment*/
    do x = 1 to 9 by 2;
        /* Calculate y
           exp function raises e to the indicated e raised to a power */
         y = 0.5 * x * exp(0.5 * x);

        /* Output the information each time through the loop */
        output;
    /* Close the loop */
    end;
 run;


/* Print the results */
proc print noobs data = tryloop1;
    /* Create titles */
    title4 'SAS Question 1';
run;

quit;
```

(i) To **save** the **SAS** script, select **File** $\rightarrow$ **Save As**. The **Save As** window opens. In the box next to *Save as:*, navigate to the folder in which you wish to save the *.sas* script file. In the box next to *File name:*, type in **in_class_do_loop_su20** and click on **Save**. This will save your file as **in_class_do_loop_su20.sas** and return you to the **Program Editor** window.

(ii) To **execute** your program, select **Run** $\rightarrow$ **Submit** or click on the *Stickman Running Figure* on the main toolbar.

Complete the table below.

x	y
1	0.824
3	6.723
5	30.456
7	115.904
9	405.077

2. Refer to Question 1. Create a high-resolution plot of y versus x.

   To accomplish this, simply add the following lines of code right **before** the **quit** statement.

```
/* Note: interpol = join  will connect the plot points.
  interpol stands for INTERPOLATE. */

symbol1 color=blue
        interpol=join
        value=trianglefilled
        height=2.5;

/* Use the axis command to define the look of the axes.
   We will use these axis1 and axis2 values in the PROC GPLOT below.
      value = (f = font_to_use h = height of the font)
      label = ( h = height of the axis label f = font of the label)
      vaxis = vertical axis haxis = horizontal axis */

axis1 value = (f = swissb h = 1.5) label = (h = 1.5 f = swissb);
axis2 value = (f = swissb h = 1.5) label = (h = 1.75 f = swissb);

proc gplot;
    /* Update title 4 */
    title4 'SAS Question 2';
    /* Create title5.  NOTE:  We can control the COLOR and FONT */
    title5 c = blue f = swissb 'My First Do Loop Plot';
    /* NOTE: we use the above axis1 and axis2 to
       modify the vaxis and haxis, respectively */
    plot y * x / ctext = darkred vaxis = axis2 haxis = axis1;
```

   When you have your plot on the screen, a lab mate check it and then put either their or your own initials here. _____.

3. Modify the program to calculate

$$t = y\sqrt{5x}, \quad x = 1, 5, 9, y = 1, 3, 5$$

NOTE: sqrt is the square root function. For example, `sqrt(x)` yields $\sqrt{x}$. This is equivalent to writing `x**(0.5)` to get $x^{1/2}$

Add the following lines of code right **before** the **quit** statement.

```
/* Set up temporary SAS dataset */
data tryloop2;
    /* Set up the do loops
       format: do start to stop by increment*/
    /*  Do loop for x */
    do x = 1 to 9 by 4;
        /* Set up loop for y */
        do y = 1 to 5 by 2;
            /* Calculate t */
            t = y * sqrt(5 * x);
            /* Output the information each time through the loop */
            output;
        /* Close the loop for y */
        end;
    /* Close the loop for x */
    end;
run;

/* Print the results */
proc print noobs data = tryloop2;
    /* Revise title4 and clear title5 */
    title4 'SAS Question 3';
    title5;
 run;
```

Save and and execute your file. Complete the table:

x	y	t
1	1	2.2361
1	3	6.7082
1	5	11.1803
5	1	5.0000
5	3	15.0000
5	5	25.0000
9	1	6.7082
9	3	20.1246
9	5	33.5410

4. (Your Turn!) Let $\boldsymbol{y = \exp^{-2n+1}\sqrt{3m}}$ for $\boldsymbol{m = 1, 3, 5}$ and $\boldsymbol{n = 1, 2, 3}$. Use nested DO loops to generate the values of m and n and compute the values of y. Complete the following table with the appropriate values of y. **NOTE:** Be aware of coding the ORDER OF OPERATIONS properly in your equation for $\boldsymbol{y}$.

	m		
n	**1**	**3**	**5**
1	0.63719	1.10364	1.42479
2	0.08623	0.14936	0.19282
3	0.01167	0.02021	0.02610

5. Exit SAS.

You have now successfully completed **SAS In Class Practice Program #2**. Please turn in this worksheet. Be sure to log off your account and make sure that your work area is neat and clean. **Don't forget your flash drive, if you used one.** Have a nice day!

Luke & Ruihan