Paper 210-25

Using SAS® Tabulate HTML Formatter – Web Publishing Tool By Examples

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ABSTRACT

SAS® Web Publishing Tools are SAS macros which enable you to convert your data files or output files to HTML format and display it on your Web browsers. This paper discusses one of SAS Formatters, known as Tab Formatter and how to invoke this macro with provided examples. The examples illustrate how to enhance your tabulation output on the Web browsers.

The SAS product utilized this paper is SAS BASE®, with SAS Formatters installed on Unix platform.

INTRODUCTION

SAS Institute has recently developed a set of Web Publishing Tools. These enable you to generate static Web pages using your SAS data and output. Web Publishing Tools are available for you to download and use. The Tools packages include: data and output formatters, GraphApplet, SAS Automation Plugin, PROC GGRAF, and VRML Browser. You can visit SAS Institute Web site (www.sas.com) to check the availability of download packages for your platform.

The HTML Formatting Tools are a set of SAS macro that allow you to convert your SAS data, output and log information for displaying on a Web browser. The Formatter macros consist of three types; each designed to convert a particular type of SAS data or output. This paper details Tabulate Formatter, one of three formatters. The Tabulate Formatter macro name is **tab2htm**.

The Tabulate Formatter converts the tabulation output from SAS PROC TABULATE procedure to an HTML file. You can modify your SAS macro arguments from macro call of **tab2htm** to enhance your ouput.

This paper is comprised of five parts. Part 1 includes the abstract and the introduction, Part 2 describes the data file utilized throughout the paper as sample data and SAS procedure TABULATE to generate the output. Part 3 is devoted to output formatter macro and presents valid arguments for this macro call. Part 4 involves output enhancements. Part 5 deals with converting SAS Tabulation output to Microsoft Word document and the conclusion.

DATA FILE

A data file contains fifty-three patients and five variables; Patient ID, Sex, Age, Reason for withdraw, and Treatment group, from a clinical trial is used for all SAS output lists and graphs in this paper. The variables in the data file are the following:

Variable	*Type*	*Label*
pid	Char	Patient ID
sex	Char	Sex
age	Num	Age in Years
trt	Char	Treatment Group
wd	Num	Reason for Withdraw

SAS CODE I

The following three SAS code blocks are the sample SAS code to produce Table 1.

```
options ps=66 ls=120
nodate nonumber nocenter;
proc format; value $sexf 'M' = '-   Male'
              'F' = '-   Female'
;

  Value $trtf
             'A' = 'Placebo    '
             'B' = '50 mg      '
             'C' = '100 mg     '
;
           value agec
                 0 - 34 =  '- < 35 yrs'
                35 - 60 =  '- 35 - 60 yrs'
                 other =   '- > 60 yrs'
            ;
run;
```

Program Block A

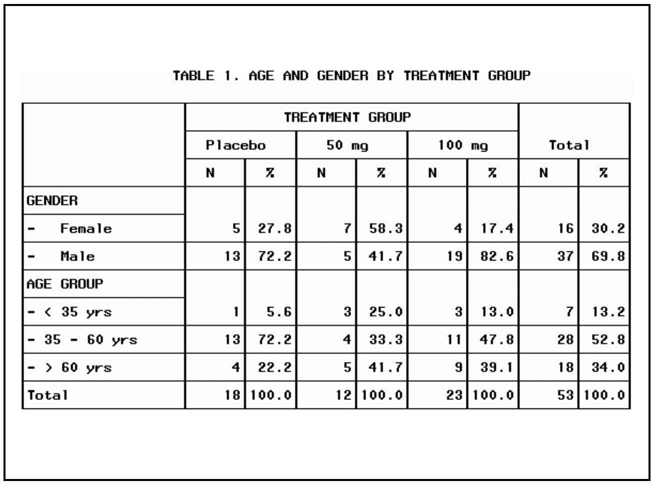
```
title '         TABLE 1. AGE AND GENDER BY
TREATMENT GROUP';

proc tabulate data=f1;
```

Program Block B

```
class sex trt age;
table sex='GENDER' age='AGE GROUP'
all='Total',
        (trt ='TREATMENT GROUP'
        all='Total          ')*
        (n= 'N'*f=6.0 pctn<sex age
all>='%'*f=5.1)
        /rts = 20 row = float;
  format trt $trtf. sex $sexf. age agec.;
run;
```

Program Block C

After execution of SAS program blocks A , B, and C, it produces Figure 1



```
                TABLE 1. AGE AND GENDER BY TREATMENT GROUP

--------------------------------------------------------------------------
|               |        TREATMENT GROUP                 |               |
|               |----------------------------------------|    Total      |
|               |   Placebo    |    50 mg     |  100 mg  |               |
|               |--------------|--------------|----------|---------------|
|               |   N  |   %   |   N  |   %   |  N  |  % |   N   |   %   |
|---------------|------|-------|------|-------|-----|----|-------|-------|
|GENDER         |      |       |      |       |     |    |       |       |
|---------------|      |       |      |       |     |    |       |       |
|-   Female     |     5|   27.8|     7|   58.3|    4|17.4|     16|   30.2|
|---------------|------|-------|------|-------|-----|----|-------|-------|
|-   Male       |    13|   72.2|     5|   41.7|   19|82.6|     37|   69.8|
|---------------|------|-------|------|-------|-----|----|-------|-------|
|AGE GROUP      |      |       |      |       |     |    |       |       |
|---------------|      |       |      |       |     |    |       |       |
|- < 35 yrs     |     1|    5.6|     3|   25.0|    3|13.0|      7|   13.2|
|---------------|------|-------|------|-------|-----|----|-------|-------|
|- 35 - 60 yrs  |    13|   72.2|     4|   33.3|   11|47.8|     28|   52.8|
|---------------|------|-------|------|-------|-----|----|-------|-------|
|- > 60 yrs     |     4|   22.2|     5|   41.7|    9|39.1|     18|   34.0|
|---------------|------|-------|------|-------|-----|----|-------|-------|
|Total          |    18|  100.0|    12|  100.0|   23|100.0|    53|  100.0|
--------------------------------------------------------------------------
```

Figure 1. Output from Sample Code I

HTML TABULATE FORMATTER

You can include the macro call in your SAS program and run it as batch mode or in interactive mode. You can invoke the Output Formatter by entering macro calls in your SAS program and enter macro arguments to the macro to specify formatting options. The following example indicate how to add Tab Formatter macro to SAS code.

To begin capturing the output, we inserted the Tab Formatter **capture=on** statement. This captures all output until a **capture=off** statement is encountered. A minimal required argument is used in this example The captures on and off statements are used to capture results generated by PROC TABULATE. The argument of **htmlfile** is converted HTML file name.

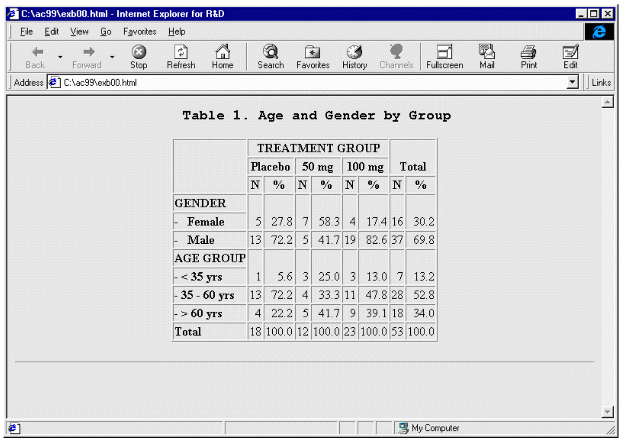
```
Insert Block A program

/* mark the start of the capture */
%tab2htm(capture=on);
title 'Table 1. Age and Gender by Group ';
proc tabulate data=f1
formchar='82838485868788898a8b8c'x;

Insert Block C Program

%tab2htm(capture=off,
          htmlfile=exb00.html);

/* mark the end of the capture */
```

Example Code 1

The FORMCHAR values expected by the **tab2htm** macro represent hexadecimal codes that have special meaning, or no meaning, on the host platform. You must include FORMCHAR value in your PROC TABULATE statements.

Note: Formchar of '82838485868788898a8b8c' x is for platforms of UNIX and PC. Formchar of 'b2b3b4b5b6b7b8b9babbbc' x is for platform of MVS

The execution of this program will produce an HTML file with file name of exb00.html. The display of this HTML file on the browser is shown in Figure 2.



C:\ac99\exb00.html - Internet Explorer for R&D
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print Edit
Address C:\ac99\exb00.html
Links
My Computer

Table 1. Age and Gender by Group

	TREATMENT GROUP						Total	
	Placebo		50 mg		100 mg			
	N	%	N	%	N	%	N	%
GENDER								
- Female	5	27.8	7	58.3	4	17.4	16	30.2
- Male	13	72.2	5	41.7	19	82.6	37	69.8
AGE GROUP								
- < 35 yrs	1	5.6	3	25.0	3	13.0	7	13.2
- 35 - 60 yrs	13	72.2	4	33.3	11	47.8	28	52.8
- > 60 yrs	4	22.2	5	41.7	9	39.1	18	34.0
Total	18	100.0	12	100.0	23	100.0	53	100.0

Figure 2. Output from Example Code I

Note: Netscape Navigator 4.0 and Microsoft Internet Explorer 4.0 are the most popular browsers. We use the same HTML file generated from SAS output formatter to test the browsers. Netscape Navigator displays a better presentation.

TABULATE FORMATTER ARGUMENTS

All valid arguments for the Tabulate Formatter macro invocation are grouped into four categories; 1) arguments that determine the output is captured and saved, 2) arguments that determine formatting characteristics, 3) general table definition, and 4) arguments that enable character transcoding.

1) ARGUMENTS THAT DETERMINE THE OUTPUT IS CAPTURED AND SAVED

Argument	*Value*	*Functionality*
capture	ON | OFF	indicates the capture mode
htmlfile	valid filename	specifies the SAS fileref that points to the HTML file where the formatted output will be written
htmlfref	valid location	specifies the SAS fileref that points to the location that HTML file where the formatted output will be written
openmode	APPEND | REPLACE	overwrites the existing HTML output file or is appended to the end of the existing file
proploc	valid	specifies the name and location of

	filename and location	your property list
runmode	I | B	specifies the macro in batch or interactive mode

2) ARGUMENTS THAT DETERMINE FORMATTING CHARACTERISTICS

Argument	***Value***	***Functionality***
bgtype	NONE | COLOR | IMAGE	indicates background type is color or image
bg	if bgtype = image thenvalid filename and location, if bgtype =color then color value	specifies background value
brtitle	title	specifies the value that appears as the title in the browser window title bar
center	Y | N	determines that all output is centered
ctext	value | DEFAULT	determines the global text color
doctype	value	specifies info. of doctype tag in the HTML file
encode	Y | N	specifies whether the Output Formatter replaces angle brackets with ASCII character representation
pagepart	all | head | body | foot	specifies which parts of the HTML page is written to the file
SASpower	value	adds the SAS Powered logo to the bottom of the HTML page
septype	NONE | RULE | IMAGE	specifies the type of separator between the pages of your output
seploc	if septype = image then valid filename and location	specifies the filename and location of the image to be used as separator

3) GENERAL TABLE DEFINITION

Argument	***Value***	***Functionality***
border	Y | N	turns borders on or off for the table
bwidth	value	specifies the thickness of the border
cpad	value	specifies the space, in pixels, between the borders of the table cell and the contents within the cell
cspace	value	specifies the space, in pixels, between the cells in the table
talign	left | center | right	indicates whether the table is aligned to the left, right, or center of the page
tbbgcolor	value | DEFAULT	specifies a background color for the entire table
twidth	value	specifies the width of the table
twunit	percent | pixels	specifies the unit used to determine the table width

Color, Font, Size, Tag and Style Sheet Class specifications for output components

Argument	***Value***	***Specifies Color, Font, Size, Class, and Tag for***
tcolor tface tsize ttag tclass	value | DEFAULT	the title lines
bcolor bface bsize btag bclass	value | DEFAULT	the bylines
ccolor cface csize ctag cclass	value | DEFAULT	the table caption
chalign	left | center | right	the table caption
cvalign	top | bottom	the table caption
bxbgcolr bxcolor bxface bxsize bxtag bxclass	value | DEFAULT	the table box cell
bxhalign	left | right | center	the table box cell
bxvalign	top | bottom | middle | baseline	the table box cell
bxwrap	Y | N	the table box cell
clbgcolr clcolor clface clsize cltag clclass	value | DEFAULT	the table column labels
clhalign	left | right | center	the table column labels
clvalign	top | bottom | middle | baseline	the table column labels
clwrap	Y | N	the table column labels
rlbgcolr rlcolor rlface rlclass rlsize rltag	value | DEFAULT	the table row labels
rlhalign	left | right | center	the table row labels
rlvalign	top | bottom | middle | baseline	the table row labels
rlwrap	Y | N	the table row labels
dbgcolr dcolor dface dsize dtag dclass	value | DEFAULT	the table data cells
dhalign	left | right | center	the table data cells
dvalign	top | bottom | middle | baseline	the table data cells
dwrap	Y | N	the table data cells
cncolor cnface cnsize cntag cnclass	value | DEFAULT	the continuation lines
fcolor fface fsize ftag fclass	value | DEFAULT	the footnote lines
bdclass	value	document body
sepclass	value	the page separator
spclass	value	the SAS Powered logo
tbclass	value	the table

4) TABLE ELEMENT ARGUMENTS

The individual elements in the PROC TABULATE output are governed by table element formatting arguments. There are three table element groups; the Table Caption, the Box cell, and Continuation line. The functionalities of each table element group are shown in the following table.

Element	***Value***	***Functionality***
Table Caption	Y | N	displays text that PROC TABULATE uses as the page dimension
Box cell	value	displays any value set by Box option of PROC TABULATE
Continuation line	value	is the line containing the string (CONTINUED) that PROC TABULATE generates when a table is split across a page.

The following chart summarizes the table definition and table format options.

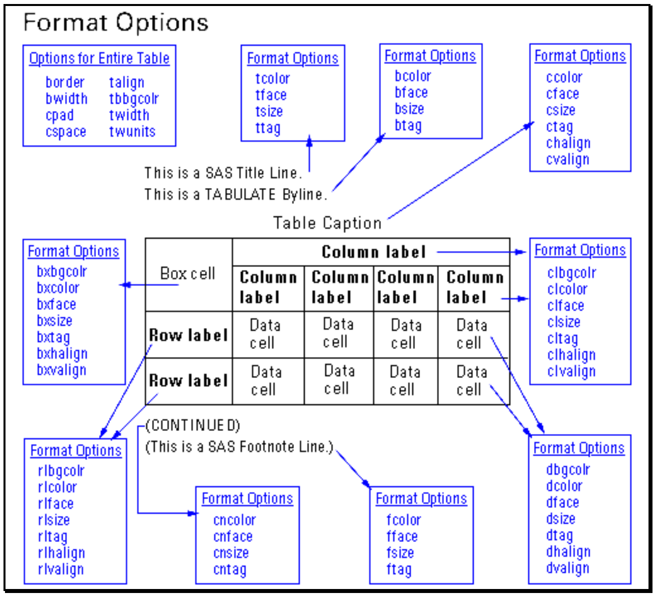


Figure 3. Table Definition and Table Format Options

4) ARGUMENTS THAT ENABLE CHARACTER TRANSCODING

Argument	***Value***	***Functionality***
tranlist	tanscoding list name and location	specifies the name and location of an existing transcoding list
charset	character set name	specifies the character set name that should appear in the <META> tag in your HTML file

Note: The Output Formatter does not check for errors on fonts, colors, or sizes you specify. So, you should specify values that are supported on your browser.

OUTPUT ENHANCEMENTS

The above arguments govern the format of the tabulation output generated by the tool. There are four methods to enhance your output: 1) using arguments modification in tab2htm macro call, 2) using PUT and FILE statements, and 3) editing your HTML file directly. Each method will be discussed, in conjunction with an example.

1) USING ARGUMENTS MODIFICATION

You can change the default values from **tab2htm** macro call and customize your output. The following SAS code illustrates the usage of the SAS macro arguments of **tcolor, tbbgcolr, center, clcolor** and **rlcolo**r, to modify the values of argument.

```
Insert Block A program

/* mark the start of the capture */
%tab2htm(capture=on);
title 'Table 1. Age and Gender by Group ';
proc tabulate data=f1
formchar='82838485868788898a8b8c'x;

Insert Block C Program

%tab2htm(capture = off,
         htmlfile = exb02.html,
         tcolor = red,
         tbbgcolr = white,
         center = y,
         clcolor = red,
         rlcolor = blue);
/* mark the end of the capture */
```

Enhancement Example Code 1

The execution of this program will produce an HTML file, *exb02.html*. The display of this HTML file on the browser is shown in Figure 2.

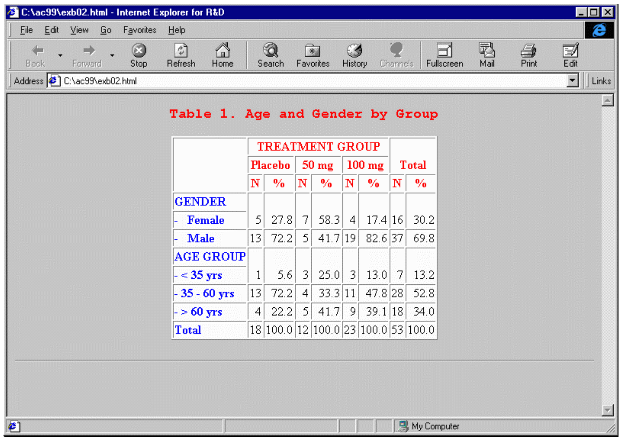

C:\ac99\exb02.html - Internet Explorer for R&D
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print Edit
Address C:\ac99\exb02.html
Links
My Computer

Table 1. Age and Gender by Group

	TREATMENT GROUP						Total	
	Placebo		50 mg		100 mg			
	N	%	N	%	N	%	N	%
GENDER								
- Female	5	27.8	7	58.3	4	17.4	16	30.2
- Male	13	72.2	5	41.7	19	82.6	37	69.8
AGE GROUP								
- < 35 yrs	1	5.6	3	25.0	3	13.0	7	13.2
- 35 - 60 yrs	13	72.2	4	33.3	11	47.8	28	52.8
- > 60 yrs	4	22.2	5	41.7	9	39.1	18	34.0
Total	18	100.0	12	100.0	23	100.0	53	100.0

Figure 4. Output from Enhancement Example Code 1

The following modification changes the background to white color and uses a separator bar at the end of the table.

Insert Block A program

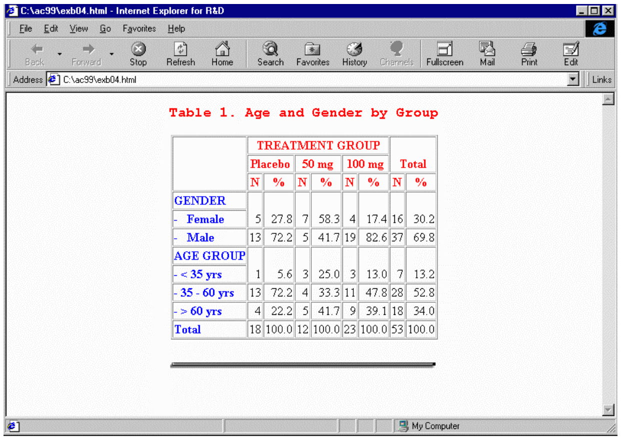
```
/* mark the start of the capture */
%tab2htm(capture=on);
title 'Table 1. Age and Gender by Group ';
proc tabulate data=f1
formchar='82838485868788898a8b8c'x;
```

Insert Block C Program

```
%tab2htm(capture = off,
         htmlfile = exb04.html,
         bgtype = color,
         bg = white,
         tcolor = red,
         tbbgcolr = white,
         center = y,
         clcolor = red,
         rlcolor = blue,
         septype = image,
         seploc = blackbas.gif
         );
/* mark the end of the capture */
```

Enhancement Example Code 2

The display of this enhancement is shown as follows:



C:\ac99\exb04.html - Internet Explorer for R&D
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print Edit
Address C:\ac99\exb04.html
Links
My Computer

Table 1. Age and Gender by Group

	TREATMENT GROUP						Total	
	Placebo		50 mg		100 mg			
	N	%	N	%	N	%	N	%
GENDER								
- Female	5	27.8	7	58.3	4	17.4	16	30.2
- Male	13	72.2	5	41.7	19	82.6	37	69.8
AGE GROUP								
- < 35 yrs	1	5.6	3	25.0	3	13.0	7	13.2
- 35 - 60 yrs	13	72.2	4	33.3	11	47.8	28	52.8
- > 60 yrs	4	22.2	5	41.7	9	39.1	18	34.0
Total	18	100.0	12	100.0	23	100.0	53	100.0

Figure 5. Output from Enhancement Example Code 2

2) USING PUT AND FILE STATEMENTS

The following SAS code indicates the usage of the SAS macro arguments of **tcolor, tsize**, and **hcolor**, in conjunction with PUT and FILE statements.

Insert Block A program

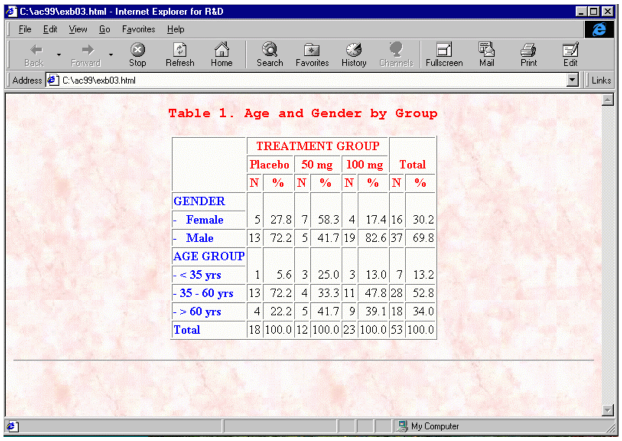
```
/* mark the start of the capture */
%tab2htm(capture=on);
```

Insert Block B Program

```
%tab2htm(capture=off,
          htmlfile=exb03.html,
          tcolor=red,
          tsize=3,
          hcolor=blue);
/* mark the end of the capture */
/* PUT and File Statemane Usage */
data _null_;
 infile 'exc03.html' END=EOF;
 file 'exc031.html';
 input;
 if n =1 then
 put '<BODY BACKGROUND=marble21.jpg>';
 if not EOF then do;
   put infile_;
 end;
 else put @1 '</BODY>';
run;
```

Enhancement Example Code 3

The output display from this enhancement example code 3 is shown in Figure 6.



C:\ac99\exb03.html - Internet Explorer for R&D
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print Edit
Address C:\ac99\exb03.html
Links
My Computer

Table 1. Age and Gender by Group

	TREATMENT GROUP						Total	
	Placebo		50 mg		100 mg			
	N	%	N	%	N	%	N	%
GENDER								
- Female	5	27.8	7	58.3	4	17.4	16	30.2
- Male	13	72.2	5	41.7	19	82.6	37	69.8
AGE GROUP								
- < 35 yrs	1	5.6	3	25.0	3	13.0	7	13.2
- 35 - 60 yrs	13	72.2	4	33.3	11	47.8	28	52.8
- > 60 yrs	4	22.2	5	41.7	9	39.1	18	34.0
Total	18	100.0	12	100.0	23	100.0	53	100.0

Figure 6. Output from SAMPLE Code I

3) USING PROPERTY LIST

The property list is a predefined set of attributes, which controls the formatting applied to your output. The default property list is:

SASHELP.HTMLGEN.OUTPROP.SLIST.

Running a property list interactively is the easiest way to view and create it. To run it interactively, you must be running Release 6.12 of SAS software and have SAS/AF installed. The following steps are provided to show how to view a property list and create your own property list.

Viewing a Property List

To invoke the properties interface, submit the following line in the Program Editor:

```
%TABPROP(runmode=I,
     proploc=SASHELP.HTMLGEN.TABPROP.SLIST);
```

The HTML Tabulate Formatter Properties window appears showing the property settings contained in the default list. You can change the settings of the property list and save it as your own property list. A custom property list, named

SASUSER.HTMLGEN.OUTOYEH.SLIST

is created.

Reviewing Property Settings

The macro SHOWPROP allows you to view the current property settings. To invoke the macro, submit the following line in the Program Editor:

```
%showprop( proploc=
        SASUSER.HTMLGEN.OUTOYEH.SLIST);
```

You can see the changes that custom property list was modified from default list.

SAMPLE CODE II

The following sample code specifies argument **proploc** as SASUSER.HTMLGEN.OUTOYEH.SLIST to use it as custom property list. This property list specifies background color as white color and uses a black bar as separator for each output. It will produce a similar output shown in Figure 3 in your browser.

```
Insert Block A program
```

```
/* mark the start of the capture */
%tab2htm(capture=on);
```

```
Insert Block B Program
```

```
/* mark the end of the capture */
%tab2htm(capture=off,
          htmlfile=exb05.html,
          proploc=
  SASUSER.HTMLGEN.OUTOYEH.SLIST);
```

4) EDITING YOUR HTML FILE DIRECTLY

If you have good knowledge of HTML language, you can modify your HTML file directly. The following example uses exb05.html file generated from previous sample code to show how to change an html file. You can open this file from SAS Display Manager, Microsoft® Notepad or other word processor and insert, edit or modify any valid HTML tag. The following code shows a company logo and GIF animation file were inserted before the separator bar.

```
 <TD ALIGN="RIGHT" VALIGN="BOTTOM">100.0</TD>
 <TD ALIGN="RIGHT" VALIGN="BOTTOM">23</TD>
 <TD ALIGN="RIGHT" VALIGN="BOTTOM">100.0</TD>
 <TD ALIGN="RIGHT" VALIGN="BOTTOM">53</TD>
 <TD ALIGN="RIGHT" VALIGN="BOTTOM">100.0</TD>
  </TR></TABLE>
<P>
<IMG SRC=edp1.gif>
<IMG SRC=tumble.gif><BR>
<IMG SRC=blackbas.gif><BR><P>
</BODY>
</CENTER>
```

Figure 7 shows the output from the modified HTML file .

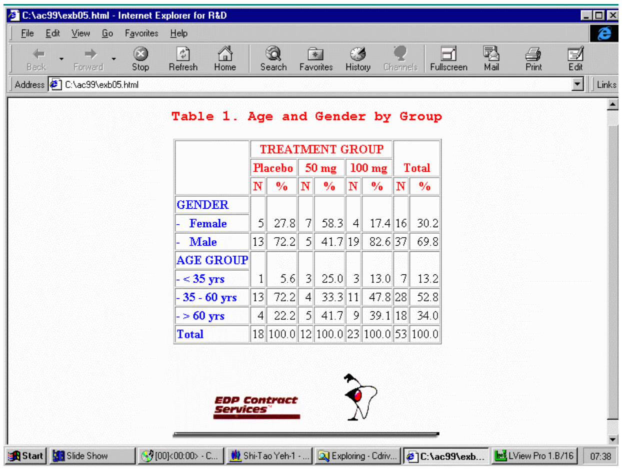

C:\ac99\exb05.html - Internet Explorer for R&D
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print Edit
Address C:\ac99\exb05.html
Links
EDP Contract Services
Start Slide Show [00]<00:00> - C... Shi-Tao Yeh-1 - ... Exploring - Cdriv... C:\ac99\exb... LView Pro 1.B/16 07:38

Table 1. Age and Gender by Group

	TREATMENT GROUP						Total	
	Placebo		50 mg		100 mg			
	N	%	N	%	N	%	N	%
GENDER								
- Female	5	27.8	7	58.3	4	17.4	16	30.2
- Male	13	72.2	5	41.7	19	82.6	37	69.8
AGE GROUP								
- < 35 yrs	1	5.6	3	25.0	3	13.0	7	13.2
- 35 - 60 yrs	13	72.2	4	33.3	11	47.8	28	52.8
- > 60 yrs	4	22.2	5	41.7	9	39.1	18	34.0
Total	18	100.0	12	100.0	23	100.0	53	100.0

Figure 7. Example of modifying HTML file directly

CONVERTING HTML FILE TO MS WORD FILE FORMAT

You can open SAS tabulation HTML file directly from Microsoft Word. The table collapses to a compact format as illustrated in Figure 8.

The drag and drop technique can be helpful to stretch the table column width. The following three steps describe how to stretch your table column width.

1) Select the vertical table boundary line that you want to stretch.

2) Hold down the left mouse button and drag the selected vertical table line to the desired location.

3) When you release the mouse button, the table expands the selected column width.

You can repeat the same process for other column width untill all columns have appropriate width size. Figure 9 clarifies the result of the technique applied to the most right table line and the most right table line. After applying the stretching steps, you can save it as a Word document.

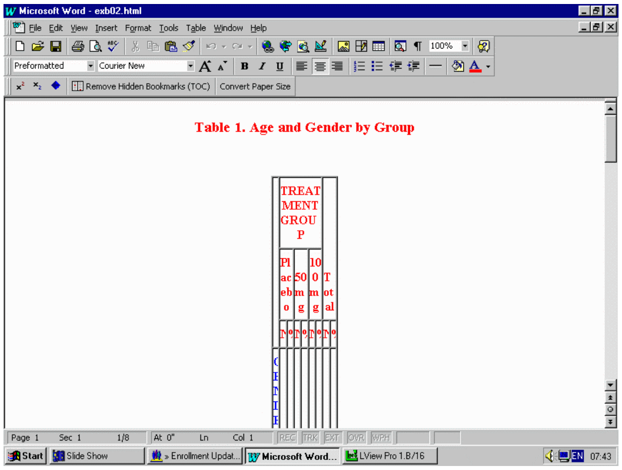

Microsoft Word - exb02.html
File Edit View Insert Format Tools Table Window Help
Preformatted
Courier New
100%
Remove Hidden Bookmarks (TOC)
Convert Paper Size
Page 1 Sec 1 1/8 At 0" Ln Col 1 REC TRK EXT OVR WPH
Start
Slide Show
Enrollment Updat...
Microsoft Word...
LView Pro 1.B/16
07:43

Table 1. Age and Gender by Group

TREATMENT GROUP

Placebo | 50 mg | 100 mg | Total

Figure 8. After Open Tabulation HTML file

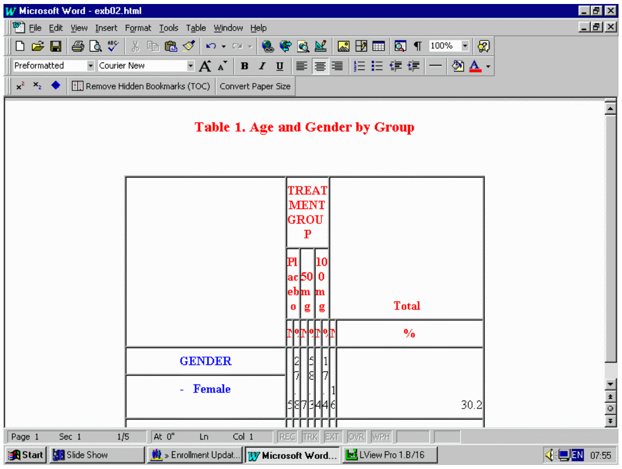

Microsoft Word - exb02.html
File Edit View Insert Format Tools Table Window Help
Preformatted
Courier New
100%
Remove Hidden Bookmarks (TOC)
Convert Paper Size
Page 1 Sec 1 1/5 At 0" Ln Col 1 REC TRK EXT OVR WPH
Start
Slide Show
Enrollment Updat...
Microsoft Word...
LView Pro 1.B/16
07:55

Table 1. Age and Gender by Group

TREATMENT GROUP

Placebo | 50 mg | 100 mg | Total

%

GENDER

- Female

30.2

Figure 9. After Stretching the Most Left and the Most Right Table Lines

CONCLUSION

This paper achieves three aims:

* To provide a brief summary document for tabulation formatter's usage, syntax and reference.

* To illustrate how to invoke this SAS macro with a step-by-step and easy-to-understand approach.

* To convert SAS tabulation output to Microsoft Word document.

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