Abstract:
SAS has been an excellent product for analyzing and displaying data. However, the output controls are all based on the character position within the line. This will work fine if the font is fixed-spaced (where the inter-character spacing is the same whatever the character), but fails when using a proportional font (where different characters have different widths). After all, If you have large saved output files and would like to print them, you will need to load them to the SAS output window first. This paper describes a macro to help you print all of your files by using the printer command.

Overview:
Let's compare these two lines:

Printing with SAS
Printing with SAS

The second line, which is a proportional font, is not as long as the first line, which is a fixed-spaced font. It is therefore possible to get more information into the same space if the proportional font is used.

Another example to illustrate the problem when using proportional fonts in column outputs:

XXX, ZZZ 10 space between (fixed font)
III, CCC

XXX, ZZZ 10 space between (proportional font)
III, BBB

As you can see, the proportional font makes it very difficult to line up columns by inserting blanks between them. To position data properly we have to express it in absolute units of measurement which are usually inches.

Overview of the HP Laser Printer:

To be able to take advantage of the capabilities of an HP laser printer, we need to understand how to control the printer by sending the commands in the PCL5 printer language which has two modes:

* PCL printer language mode.
* HP-GL/2 graphics mode.

The PCL printer language is used for standard printer operations, such as selecting fonts, defining a page, and printing data. The HP-GL/2 graphics mode is primarily used for vector graphics (typically output on a pen plotter). Both PCL printer language commands and HP-GL/2 commands can be used on the same page. We will be interested in the PCL printer command.

To select a font for printing, the printer needs to know the following information: symbol set (a unique set of symbols within the ASCII and EBCDIC platforms), spacing (whether the font is proportional or fixed), height (to control the height of the font in point it ignored when a fixed font selected), pitch (describes the number of characters printed per horizontal inch for a fixed font only), style (the angularity of the characters with respect to the X-axis, i.e., italics), stroke weight (describes the thickness of the character, i.e., bold), typeface (a generic name for the characters having a common design like the courier font), and orientation (landscape or portrait). Each of these commands has a default that takes effect when the printer is initialized, either by powering it on or by a software command. The PCL printer commands always begin with the escape character. The escape character precedes a unique series of letters and numbers that tell the printer what to do (a list of these commands can be found in the HP LaserJet 4Si Printer section of the Users Reference Manual, page A-15).

*************************************************************

* PROGRAM NAME: sasprint.SAS
* PURPOSE: This program can be used as a utility macro to print saved SAS output to any HP printer;

*DESCRIPTION: This macro will help in printing a saved SAS output to the HP printer. It will set the escape sequence command in a macro variable(&sasprint) or in a file(temp0). You will need to run the macro with your program and saved the output to file. For future use when printing the output, go to the DOS line command and copy your file to the printer;

*************************************************************

279
* MACRO VARIABLES: *
**************************************************.
* Sample Program: *
**************************************************.
* %INC 'c:\sasprint.sas'; *
* options ls=170 ps=60 pageno=1; *
* filename out printer 'lpt1:'; *
* %sasprint; *
* proc printto print=out; *
* data test; *
* joe=1;han=3;amy=5.5; *
* proc print; *
* title1 "&sasprint"; *
* title2 'This test for sasprint' *
* run; *
* proc printto; *
**************************************************.
* %Macro SASPRINT; *
%global SASPRINT RESET; *
***************************************************.
** The printer searches all available fonts and ** *
** selects the one that most closely matches the ** *
** select table characteristics. The printer ** *
** will also prioritize these characteristics ** *
** as follows: ** *
** Symbol Set High ** *
** Spacing I ** *
** Pitch I ** *
** Height I ** *
** Style I ** *
** Stroke Weight I ** *
** Typeface Family I ** *
** Resolution I ** *
** Location I ** *
** Orientation Low ** *
***************************************************.
** All control commands for the laser printer ** *
** start with the ESCAPE character, which is the ** *
** 27th character in the ASCII code ** *
***************************************************.
data _null_;
call symput('esc',byte(27));
run;
***************************************************.
** Put the original LINESIZE= and ** *
** PAGESIZE= settings into macro variables for ** *
** later use by reading SASHELP.VOPTION and ** *
** writing the values into macro variables. ** *
***************************************************.
data _null_;
set sashelp.voption;
where optname='LINESIZE' or optname='PAGESIZE';
call symput(optname,setting);
run;
%let extrapg=5;
%let extraln=4;
%let pagesize=%eval(&pagesize+%extrapg);
%let linesize=%eval(&linesize+%extraln);
******************************************************************************;
** Vertical Motion Index to control the vertical ** *
** line spacing for the line printer. ** *
******************************************************************************;
%macro linep(ls=&linesize,ps=&pagesize);
%global vmi hmij
%let vertpos=&esc%nrstr(&)l&vmi.C;
%let horzpos=&esc%nrstr(&)k&hmi.H;
******************************************************************************.
%let reset=&esc.E;
******************************************************************************.
%if &ls le 84 %then %do;
vmi=trim(left(round((10/(&ps+7))*48),0.01));
hmi=trim(left(round((120*8)/(&ls+45)),0.01));
call symput('vmi',vmi);
call symput('hmi',hmi);
run;
%end;
%else %do;
vmi=trim(left(round((7.5/(&ps+5))*48),0.01));
hmi=trim(left(round((120*10.5)/(&ls+20)),0.01));
call symput('vmi',vmi);
call symput('hmi',hmi);
run;
%end;
%end linep;
%linep;
%let vertpos=&esc%nrstr(&)l&vmi.C;
%let horzpos=&esc%nrstr(&)k&hmi.H;
******************************************************************************.
** To reset the printer to its original defaults ** *
** use esc E ** *
******************************************************************************.
%let reset=&esc.E;
******************************************************************************.
** For the symbol set for the HP printer, we use ** *
** the PC-8 symbol set for line printer. ** *
******************************************************************************.
%let pc8=&esc.(10U;
%let symline=&esc.(8U;
Spacing command controls whether the font is proportional or fixed.
%let fixed=&esc.(sOP;
%let prop =&esc.(s1P;

Pitch command controls the horizontal spacing for fixed fonts. It will be ignored when a proportional font is selected.
%let pitch10=&esc.(s10H;
%let pitch12=&esc.(s12H;
%let pitch16=&esc.(s16.6H;
%let pitch12l=&esc.(s12.00h;
%let pitch14l=&esc.(s14.00h;
%let pitch16l=&esc.(s16.6h;
%let fontnorm=&esc.(s10H;

Height command controls the height of the font in points. It will be ignored when a fixed font is selected.
%let ht8=&esc.(s8V;
%let ht10=&esc.(s10V;
%let ht12=&esc.(s12V;
%let ht14=&esc.(s14V;
%let ht16=&esc.(s16V;
%let ht18=&esc.(s18V;
%let ht12l=12.0v;
%let ht14l=14.0v;

Style command controls the angularity of the characters as well as their structure. Styles are specified by changing the number. Available styles are 0 upright, 1 italic, 4 condensed, 5 condensed italic, 8 compressed (extra condensed), 24 expanded, 32 outline, 64 inline, 128 shadowed, 160 outline shadowed.
%let italic=&esc.(1S;
%let normal=&esc.(OS;

Stroke Weight command controls the thickness of the characters. The stroke weight falls within the range -7 to +7, with -7 being the thinnest, and +7 the thickest.
%let boldon =&esc.(3B;
%let boldoff =&esc.(OB;

Typeface command controls the look of the font. We can select the CG Times Typeface, Univers, Letter Gothic or Lineprinter.
%let cgtimes=&esc.(4101T;
%let univers=&esc.(4148T;
%let gothic =&esc.(4102T;
%let linepr =OsOBOT;

Orientation command controls the orientation of the page.
%let portrait=&esc%nrstr(&)lO0;
%let landscap=&esc%nrstr(&)110;

Margin command controls the margins of the page.
%let topmarg=&esc%nrstr(&)lSEj
%let leftmarg=&esc%nrstr(&)a12L;
%let leftmrg=&esc%nrstr(&)a3L;
%let rigtmarg=&esc%nrstr(&)aSM;
%let linesize=&linesize;
%if &linesize<=84 %then %do;
    %let SASPrint=&portrait&leftmarg&symline&pitch16l&ht12l&linepr&vertpos&horzpos;
%end;
%else %do;
    %let SASPrint=&landscap&leftmrg&symline&pitch16l&ht12l&linepr&vertpos&horzpos;
%end;
%put sasprint=&sasprint;

The file tempO.txt can be used to copy with your output file if you do not want to use the macro variable with the first title.
* i.e., * options noxwait; * i.e., data _null_; * command='copy hanyO.txt+hany3.txt' || 'output.dat' * call system(command); * run;
Conclusion:

A great deal of flexibility can be gained by using the printer control codes. These codes can be inserted in the Title statement allowing complete tailoring for the print job. This approach may have the advantage of printing a whole production library and getting the job done faster (always a consideration these days).

Trademarks:

SAS is a registered trademark of the SAS Institute, Inc., in the USA and in other countries.

PCL and LaserJet are registered trademarks of the Hewlett-Packard Corporation.

Windows is a registered trademark of the Microsoft Corporation.

Acknowledgement:

The author would like to thank Marilyn Jacobs for comments and preparation of this paper.

References:


John Laing, SAS Institute (Canada), Inc.: Proportional Fonts with SAS® Software - Yes You Can!; SUGI 20

Contact:

Hany Aboutaleb
Pfizer Inc.
235 East 42nd street
New York, NY 10017-5755
Mail Stop:150-37-30
Office: (212) 733-4718
Fax: (212) 309-4346
Internet:abouth@pfizer.com