



## Customized Pagination Using %PAGEOFNO Macro

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### Abstract

Reports typically include page numbering, which is readily available using the NUMBER option in SAS®. But, there is no option that would include the total number of pages, along with the page number, having the format *Page 13 of 145*, for example. At least, not without substantial effort by the programmer. This paper explains several macros that includes the total number of pages as part of customizing the pagination of SAS® output.

### Introduction

In the real world of doing data analysis, SAS® often produces reports consisting of hundreds of pages of output. And, sometimes, it is imperative to know how many pages comprise a report, making sure that you have all the output. Currently, SAS® does not provide pagination that includes any customizing features or, even, the total number of pages. At best, you can use the NUMBER option and the PAGENO option to specify pagination and to reset page numbering, respectively.

Obtaining pagination that includes the total number of pages requires programming outside the scope of the analytical task, in order to make the report more acceptable and complete. Using the SAS® Macro Language, several macros were developed to solve this task of paginating SAS® output.

### The %PAGEFILE Macro

The %pagefile macro specifies the FILENAME statement which defines the destination file used by the PRINTTO procedure. This macro needs some modification depending on the operating system.

```
%MACRO PAGEFILE; (MVS)

  OPTIONS NONUMBER;
  FILENAME ROUTED '&MYTEMP' DISP=NEW
    SPACE=(CYL,(40,20));

  PROC PRINTTO PRINT=ROUTED NEW;
  RUN;

%MEND PAGEFILE;
```

### The %JUSTIFY Macro

The %justify macro inserts user-specified text that may be either left or right justified. Notice that the parameters **left** and **right** require quoted text.

```
%macro justify(titlen, left=' ',
  right=' ', ls=132);
  %global &titlen.;
  data _null_;
    retain left &left. Right &right.;
    if left eq ' '

```

```
      then len_left = 0;
      else len_left = length(left);
    if right eq ' '
      then len_rite = 0;
      else len_rite = length(right);
    blankcnt = (&ls. - len_left - len_rite);
    call symput("&titlen.", left ||
      repeat(' ',blankcnt-1) || right);
  run;
%mend justify;
```

The first example of this macro creates both left and right justified text in the title; whereas, the second example simply left justifies text in the title.

```
%justify(title1, left=" ABC REPORT" ,
  right=" &VMSSASIN ( &sysdate., &systeme.)" );

%justify(title1, left=" ABC REOPORT" );
```

### The %PAGEOFNO Macro

The %pageofno macro, which contains no parameters, does the actual pagination. First, it computes the total number of pages in the output file generated from a SAS® procedure or DATA \_null\_ step. Then, it replaces the user-specified unique character string, such as '####' with the pagination phrase, that is, 'Page 1 of 145.'

In computing the total number of pages, it's possible to count the number of carriage control characters that identify a page break. However, that character depends on the operating system. Using this approach, the macro uses the SUBSTR function to ascertain the first character in each record of the output file in order to compute the total pages.

### ANSI-Defined printer control characters

Pagebreak Code	Operating System	Binary code
1	MVS	00110001
	VMS	00001100
	PC-SAS®	00001100

```
%macro pageofno;

  proc printto; /* set to program output */

  /* NOPRINT option to write to a file */
  /* whose data already contains these */
  /* carriage control characters. */

  data routed;
    infile routed noprint end=eof length=lg;
    input @1 cc $varying132. lg;
    retain n 0;
```

```
Option #1
/* searches for string "####" as counting */
/* pages. */

pointer=index(cc,"####");
if pointer ne 0 then do;
```

```
n=n+1;
pageflag=1;
end;
```

```
Option #2
/* searches for carriage control character */
/* "pagebreak" as counting pages. */

if put(substr(cc,1,1),$binary8.) =
'00001100' then do;
n=n+1;
pageflag=1;
end;
```

```
/* collects total number of pages at */
/* the end of file. */
if eof then
call symput("pagetot",compress(n));
run;

/* NOPRINT option to suppress the carriage */
/* control characters to the left side. */

data _null_;
set routed;
file print noprint ls=132 notitles;

retain n 0;

if pageflag then do;
pageofno= "page" || " " ||
compress(n) || " " ||
"of " compress("&pagetot");
```

```
Option #1
/* capture # of characters where #### */
/* string is */
cc = substr(cc,1,pointer-length(pageofno))
|| pageofno;
```

```
Option #2
/* carriage control -breakpage- character */

cc = substr(cc,1,132-length(pageofno))
|| pageofno;
```

```
n=n+1;
end;

put @1 cc $char132.;
run;

%mend pageofno;
```

**Example**

Consider the example below that utilizes the macros discussed.

```
%pagefile;

%justify(title1, right="####" );

options nobyline missing=' ` nodate;

proc report data=display headline missing
nocenter spacing=1 split=" ^" ;

column pagebrk name sex age bar date
passfail reason;

define pagebrk / order noprint;
define name / order width=5 left;
define sex / order width=3 center;
define age / order width=3 center;
define bar / display width=1 flow;
define date / display width=8 center;
define passfail / display width=6 left;
define reason / display width=20 left;

label name = 'Name'
sex = 'Sex'
```

```
age = 'Age'
bar = '|'
date = 'Date'
passfail = 'Pass/Fail'
reason = 'Reason';

title1 "&title1." ;
title3 " D R U G T E S T " ;
run;
```

%pageofno;

**Example of output**

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D R U G T E S T

Name	Sex	Age	Date	Pass/Fail	Reason
Tracy	F	43	04/15/82	Pass	
Joe	M	35	07/23/79	Fail	Illegal drug
Kelly	F	28	02/18/92	Pass	

**Conclusion**

Pagination of large reports contributes to the integrity of its contents as well as augments the aesthetic quality of the report. The several macros discussed make it readily available to attain that higher standard.

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