Paper 199-28

Making the Most of Version 9 Features
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ABSTRACT
Performance improvements are the well-publicized enhancement to Version 9, but what else has changed that impacts your "SAS Tasks"? This Hands On Workshop explores many new Version 9 features including:

- new functions that may eliminate the need for complex expressions
- changes and additions to informats and formats
- procedure enhancements
- interface additions and improvements
- new Graph capabilities
- and more. . .

This workshop is beneficial for Version 8 SAS users who are getting started with Version 9.

INTRODUCTION
The new high-performance architecture of SAS Version 9 enables performance improvements that are clearly the "biggest" Version 9 success story. However, there are many other additions to Version 9 that will streamline your programming, and reduce lengthy coding and logic. This hands-on-workshop focuses on the software enhancements that can change your daily coding routine.

This paper provides a brief synopsis of the topics that will be covered in the hands-on-workshop. The detailed hands-on-workshop presentation is available at the SUGI 28 presentation, or from the author following SUGI 28.

INTERFACE ENHANCEMENTS
When you first access Version 9, you will notice few changes to the windowing environment.   This means that you will instead be able to focus your energies on performance and programmatic enhancements.

A few interface enhancements include:
- ability to use line numbers in the Enhanced Editor Window
- additional icons in the Explorer window
- more integrated help facility, including SAS Online Doc®
- Import / Export wizard support of
  o Microsoft Excel 2002 spreadsheets
  o Identification of a specific sheet to import from or export to
  o Ability to export to multiple sheets.

FORMATS AND INFORMATS
You can improve the readability of your programs by using longer format and informat names. Character format and informat names can be a maximum of 31 characters. The maximum length for numeric format and informat names is now 32.

COMPATABILITY WITH PREVIOUS VERSIONS
If you require access to your version 9 SAS data sets from version 8, you should avoid using the longer format and informat names. Version 8 can read Version 9 SAS data sets that use 8 byte or shorter format and informat names.

FUNCTIONS
Prior to version 9, you probably used complex sequences of functions or steps to accomplish standard tasks. When you concatenated 2 character strings, you likely had to left justify, trim, and include an extra blank to get the proper result.   If you needed to determine the *second highest value* in a list of variables for each observation, you likely used quite a few comparative statements or maybe even used a PROC.

More than 60 analytic and data manipulation functions were added to Version 9. Many functions were added to Version 9 to reduce code complexity. Additionally, the logic behind some functions was revised to improve performance (LENGTH and TRIM functions).

REDUCE CODE COMPLEXITY
In Version 9, several character functions were added to reduce the complexity of common tasks. For example, the CATX function provides a straightforward solution to joining 2 strings so the result removes leading and trailing blanks and includes a designated character as a separator.

Version 8 Solution:

```
Combine = trim(left(Char1)) || ` `
          || left(Char2);
```

Version 9 Solution:

```
Combine = catx(` `, Char1, Char2);
```

If you have used repetitive INDEX and SUBSTR functions to determine how many times a "word" occurs in a character string, that task can also be accomplished more easily in Version 9. The COUNT function determines the number of times *argument 2* occurs in *argument 1*.

COMPUTING STATISTICS OR QUANTITIES
If you work frequently with Medians or Percentiles, you can now obtain those quantities in the DATA step. The MEDIAN function determines the median of non-missing values. The PCTL function accepts a percentage for *argument 1* to specify the percentile of interest. It then computes that percentile for the list of values.

If you need to find the *second largest* value in a list of values, or perhaps the *third smallest* value, the LARGEST and SMALLEST functions are available. In addition to supplying a list of values, you supply *which* placement you are looking for.

CREATING MACRO VARIABLES
Users of CALL SYMPUT commonly include LEFT, TRIM and PUT functions to make sure that the macro variable value is constructed properly.

```
call symput( `Max` ,
            trim(left(put(maxValue , 8.))) );
```

The Version 9 CALL SYMPUTX handles left justification, trimming, and also character conversion.

```
call symputx( 'Max' , maxValue);
```

DATA STEP ENHANCEMENTS
Several DATA step enhancements may reduce your coding and enhance your results

LOG MESSAGING
If you use the log for custom debugging or messaging, you may find the Version 9 PUTLOG statement useful. PUTLOG always writes to the LOG regardless of the current FILE destination. Additionally, if the message begins with "ERROR:", "WARNING:", or "NOTE" then the message will be appropriately colored in the LOG.

USING AN IN OPERATOR
The introduction of the IN operator many versions ago reduced the need for extensive IF statement comparisons. Now, the flexibility of the IN operator has been further enhanced to reduce manual input. Integer ranges can be specified with an IN operator:

```
if code in (3 7:11 15 19:25) then
   put 'Found';
```

ADDITION WORTH EXPLORING
Additional enhancements well worth exploring include:

- PERL regular expressions for fast search, extract, and replace

- Hash tables for searching a collection of values on a key and for sorting values in the DATA step.

PROCEDURE ENHANCEMENTS
The version 9 enhancements to BASE SAS procedures focused primarily on ODS formatting and on Multi-thread support.

ENHANCED ODS FEATURES
The following BASE procedures were enhanced with additional features usable with ODS:

- CONTENTS
- DATASETS
- CORR
- FREQ
- UNIVARIATE.

MULTI-THREADED PROCESSING
The following BASE procedures were enhanced to support multi-threaded processing. This feature can be deactivated by using the NOTHREADS Procedure option.

- CONTENTS
- DATASETS
- CORR
- FREQ
- UNIVARIATE.

GRAPHICS
SAS/GRAPH software continues to include powerful

enhancements with each new version of the software. One often requested enhancement to Version 9 is the GBARLINE procedure, which creates vertical bar charts with a plot line connecting the bars. While this may sound trivial, many users wrote complex code to produce this type of graph in previous versions.   This new procedure includes options to fully customize the appearance of the plot line and bars (similar to the corresponding GCHART and GPLOT features).

CONCLUSION
In addition to the performance enhancements with SAS Version 9 SAS, there are many opportunities to improve upon coding techniques using the new functions and statements added to BASE software. Removing complex coding and replacing with the more logical new functions can streamline coding.   Usage of longer format and informat names improves program readability.

The list of enhancements is extremely long; our focus on day-to-day programming tasks is a start towards effective use of Version 9.

REFERENCES
The SAS website www.sas.com has extensive and excellent documentation on the new features available with Version 9. In addition to understandable overviews of the new architecture and resulting performance enhancements, you will also find product-by-product details of all new features.

The SAS website (including the SAS Online Doc) served as the reference material for this paper.

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