

Dynamically generating macro invocations using SAS® keyboard abbreviations

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- Introduction
- Problem Description
- Preferred Solution
- Standard Approach
- More Dynamic Approach
- Conclusion

- This presentation will cover
 - A well-defined problem description
 - A short introduction to keyboard abbreviations
 - The benefits and drawbacks
 - How to eliminate the drawbacks

- The paper was based on:
 - SAS Enhanced Editor in SAS 9.2
 - Windows environment

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■ Environment

- A lot of validated SAS macros
- Many macro parameters
- Tedious to memorize
Time consuming to look-up

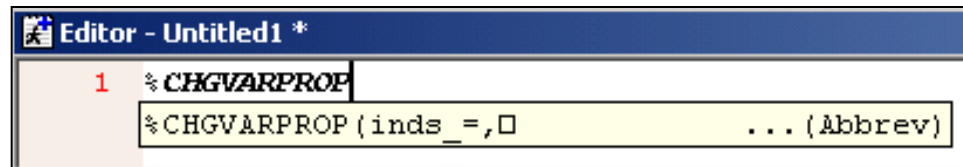
■ Business need

- Preferably a tool in SAS
- Provides the requested macro invocation
- On simple demand
- Available for all SAS users

- An example macro
 - %CHGVARPROP
 - Changes one or more properties of a variable
 - parameters:
 - » inds_
 - » var_
 - » newvar_
 - » varlabel_
 - » varfmt_
 - » varinfmt_

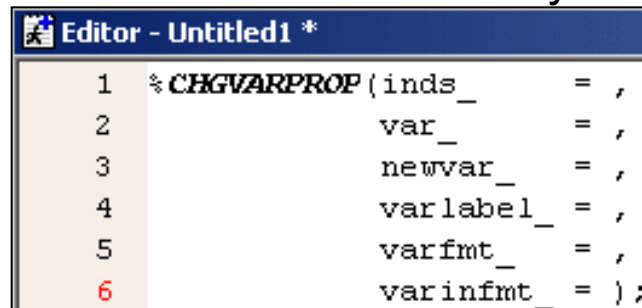
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- Keyboard abbreviations:
 - Standard functionality in SAS Enhanced Editor
 - Upon entry of a pre-defined keyword SAS will suggest the replacement text:



The screenshot shows a window titled "Editor - Untitled1 *". On line 1, the text "%CHGVARPROP" is entered. A suggestion box appears below it, showing the full keyword "%CHGVARPROP (inds_ =, □ ... (Abbrev)".

- Press TAB- or ENTER-key to insert

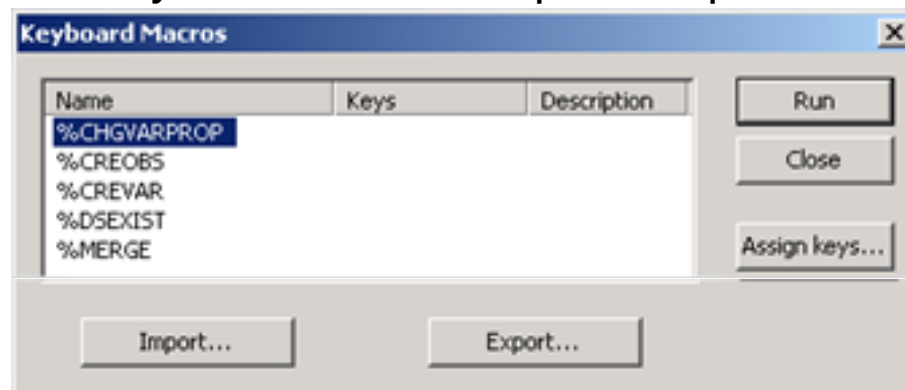


The screenshot shows the same window "Editor - Untitled1 *". The text from the suggestion box has been inserted, resulting in the following code:

```

1 %CHGVARPROP (inds_ = ,
2               var_   = ,
3               newvar_ = ,
4               varlabel_ = ,
5               varfmt_ = ,
6               varinfmt_ = );
  
```

- Keyboard abbreviations:
 - Easily shared between users/machines
 - Via *Keyboard Macros* export / import functionality



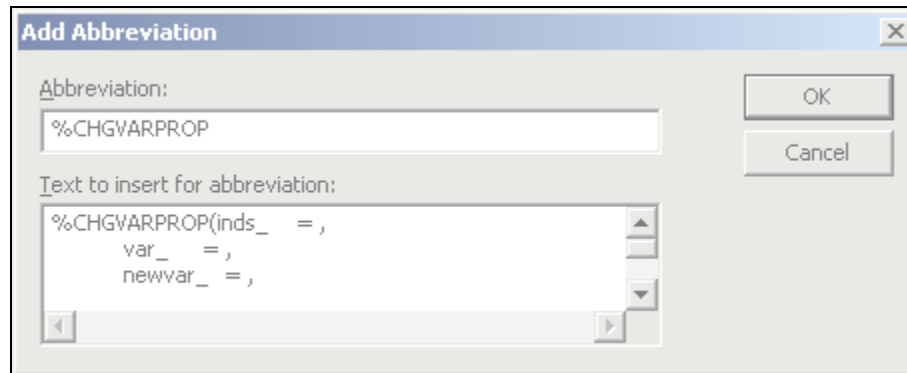
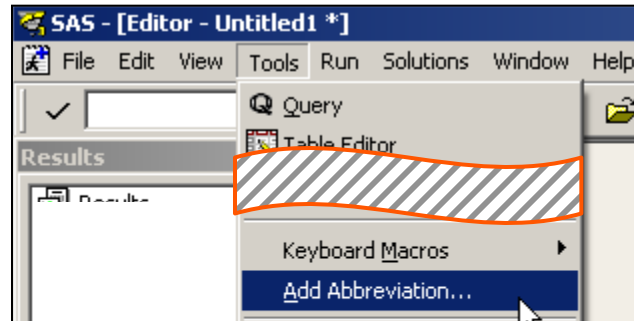
- The export creates a .kmf-file

- Technical limitations
 - Case sensitivity in keyword recognition
 - Max 401 abbreviations
 - Replacement text limited to 30.000 characters

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- Entry via provided SAS functionality



■ Drawbacks

- Manual process
- Possibly labor intensive and time consuming
 - Many macros → large initial cost
 - Maintenance cost
- Risk for errors

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More Dynamic Approach

■ Goal

- Eliminate the drawbacks

■ How

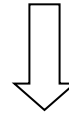
- Generate .kmf-file automatically
- Include all up-to-date macro invocations

■ Means

- Extract macro invocations (SAS macro)
- Decipher the .kmf-file algorithm
- Create .kmf-file generator (SAS macro)

- Extract macro invocations
 - Automatically retrieve all macro definitions
 - Convert into macro invocations
 - Load into standardized file for .kmf-file generator

```
%macro CHGVARPROP(inds_ =, var_ =, newvar_ =, varlabel_ =, varfmt_ =, varinfmt_ =);
```



	_KMF_seq	_KMF_name	_KMF_inStr
1	4	%CHGVARPROP	%CHGVARPROP(inds_ = , var_ = , newvar_ = , varlabel_ = , varfmt_ = , varinfmt_ =);

More Dynamic Approach

■ .kmf-file generator

- Read standardized file
- Apply logic from .kmf-file algorithm
- Create valid .kmf-file on a central location
- Can be imported by all SAS users

	_KMF_seq	_KMF_name	_KMF_inStr
1	4	%CHGVARPROP	<pre> %CHGVARPROP(inds_ = , var_ = , newvar_ = , varlabel_ = , varfmt_ = , varinfmt_ =); </pre>



.kmf-file

- Due to the complex nature
 - Details on the analysis of the .kmf-file
 - The .kmf-file generator (SAS code)

- ▶ Are located in the paper 😊

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- Keyboard abbreviations are
 - Easy to use
 - Usefull
 - Time-saving

- Don't necessarily imply a lot of work when generated automatically

- Can be used for other purposes
 - E.g.: macro and parameter descriptions

SGS

QUESTIONS?



**WHERE EXPERIENCE
MEETS SPEED**