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CLINICAL RESEARCH



CT04 - SAS PACKAGES FOR CLINICAL PROGRAMMING

Author : Eldho Alias

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What is a SAS Package?

A SAS package is an automatically generated zip file containing structured code and additional 'driving' files. It simplifies code sharing, separating complexities and streamlining deployment for developers and users.



SAS Package Framework Macros

- SAS Package frameworks mainly consists of following macros:
 - generatepackage
 - helppackage
 - installpackage
 - Listpackages
 - loadpackage
 - loadpackages
 - previewpackage
 - unloadpackage
- Copy the usepackage.sas file into the C:/PCKG directory or directory you want to install the packages. The "usepackage.sas" program, which contains the above framework components.
- To activate the SAS Packages Framework, we execute the following code:

```
filename packages ".....\Global Packages";  
%include packages(usepackage.sas);
```



CREATING A PACKAGE

1. Make a package folder and add 'usepackage.sas.'
2. Make a directory with the package name.
3. Add 'description.sas' to the folder.
4. Create subdirectories for code files.
5. Organize files accordingly.
6. Use `"/*** HELP START ***/` and `"/*** HELP END ***/` for help sections.
7. Include 'license.sas' with 'description.sas' in the package folder.
8. Run the provided code.

`%generatePackage(filesLocation=..... \genadam\);`

When the `%generatePackage` macro ends its execution the `packagename.zip` file, containing all package content inside it, is created inside the package folder.

generatepackage

Utilize the 'generatepackage' macro to generate SAS packages. After setting up the folder structures, this macro is employed to create the package within the designated directory.

```
%generatePackage(filesLocation=..... \genadam\);
```

installPackage

To install a package into package folder we will use the following code:

```
%installPackage(packageName);
```

```
%installPackage(packagesNames= genadam,sourcePath  
=..\genadam\);
```

```
*** genadam start *****
Source information:
  Filename :
    E:\Working Folder\Eldho\R\Package Development\genadam\genadam.zip
  RECFM :
    N
  LRECL :
    1
  File Size (bytes) :
    28582
  Last Modified :
    11Oct2023:13:08:38
  Create Time :
    11Oct2023:13:08:38

The following file will be replaced during
installation of the genadam package:
  E:\Working Folder\Eldho\R\Global Packages\genadam.zip
Done with return code RC=0 (zero = success)
*** genadam end *****
```

Fig 1

loadPackage/unloadPackage

To load the package into current SAS session the user runs:

%loadPackage(packageName)

To load multiple packages:

%loadPackages(packageName1, packageName2)

To remove the contents of the package from the current SAS session, the user executes:

%unloadPackage(packageName)

helppackage

To obtain information about the package and have it displayed in the log:

for general information about the package
%helpPackage(packageName)

for all available information about the package
%helpPackage(packageName,*)

for a particular element of the package, e.g. a function or a macro,
%helpPackage(packageName, helpKeyword)

listpackages

Macro to list available SAS packages into the log

%listPackage;

```
/******  
#  
# Listing packages for: E:\Working Folder\Eldho\R\Global Packages  
#  
#  
# E:\Working Folder\Eldho\R\Global Packages/genadam.zip *****  
# Package: genadam  
# Title: SAS Package for handling ADAM dataset creation.  
# Version: 2.0  
# Author: Genpro (Genpro@catalystcr.com)  
# Maintainer: Genpro  
# License: MIT  
#  
# E:\Working Folder\Eldho\R\Global Packages/gensdtm.zip *****  
# Package: gensdtm  
# Title: SAS Package for handling SDTM dataset creation.  
# Version: 1.0  
# Author: Genpro (Genpro@outlook.com)  
# Maintainer: Genpro  
# License: MIT  
#  
******/
```

Fig 2

previewpackage

If we want to preview the package content, e.g. code of a macro, an IML module, a format/informat, or a function then the:

%previewPackage(packageName, searchedElement)

will print out the code of searched element (including all comments).

```
*** START ***
Type: Package
Package: genadam
Title: SAS Package for handling ADAM dataset creation.
Version: 2.0
Author: Genpro (Genpro@catalystcr.com)
Maintainer: Genpro
License: MIT
Encoding: UTF8

Required: "Base SAS Software"

DESCRIPTION START:
## The genadam ##

The `genadam` is a SAS package and
it can be used for ADAM dataset creation with ease!
It is created during the 2020

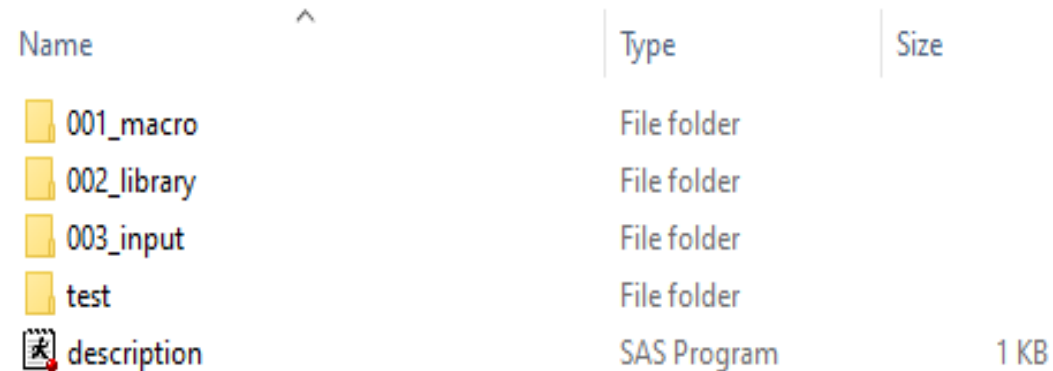
It helps me to share my code with other SAS users!
DESCRIPTION END:
NOTE: Preview of the genadam package, version 2.0, license MIT
*** END ***
NOTE: Fileref P8904D3E has been deassigned.
```

Fig 3

The “Genadam” Package

This is a Package “Genadam”, an example on how to build a package with help of the SAS Packages Framework.

We will generate a Genadam package. A package used to create ADAM datasets.



Name	Type	Size
001_macro	File folder	
002_library	File folder	
003_input	File folder	
test	File folder	
description	SAS Program	1 KB

Fig 4

.....

Follow the step-by-step instruction below.

1. Create a folder for the framework e.g., \Global Packages
2. Enable the SAS Packages Framework in the folder we created in the Step 1.
3. Create a folder for the content of the package we will generate e.g., \genadam\
4. Inside the directory from the Step 3. We creates three sub-folders: 01_macro ,02_library, and 03_input.
5. Inside the 01_macro folder we develop required macros or copy the existing ones.
6. Inside the directory from the Step 3. create a description.sas file.
7. Execute the following code using the folder from the Step 3 and check the log to see how the process of package generation went.

```
%generatePackage(filesLocation=..... \genadam\);
```

Name	Type	Size
 001_macro	File folder	
 002_library	File folder	
 003_input	File folder	
 description	SAS Program	1 KB
 genadam	Compressed (zipp...	28 KB

Fig 5

.....

Follow the step-by-step instruction below.

8. See the information in the output window and in the log. The WARNING:[License] No license.sas file provided, default (MIT) licence file will be generated.
9. Check the directory from the Step 3. and look for the genadam.zip package file(Fig 5).
10. To install the genadam package use the following code:

```
%installPackage(packagesNames= genadam,sourcePath =...\genadam\);
```
11. To load genadam package into sas environment:

```
%loadPackage(genadam);
```

• • • • •

```
*** START ***
## The genadam ##

The `genadam` is a SAS package and
it can be used for ADAM dataset creation with ease!
It is created during the 2020

It helps me to share my code with other SAS users!

Package contains:
1. macro      autoformats
2. macro      combsupp
3. macro      dayder
4. macro      decimal
5. macro      finalcheck
6. macro      getadsl
7. macro      lobxfl
8. macro      maxmindt
9. macro      seq

Required SAS Components:
Base SAS Software

***
* SAS package generated by generatePackage, version 20230904 *
***
NOTE: Help for package genadam, version 2.0, license MIT
      *** END ***
NOTE: Fileref P8904D3E has been deassigned.
```

Fig 6

....

CONCLUSION

The SAS package facilitates efficient code sharing and addresses the challenge of using shared macros effectively. With instant access to help files, it benefits programmers unfamiliar with the code. As a repository for collaborative development, it has global potential. This initiative becomes even more attractive due to SAS software's limited availability.

Demonstrated packages showcase how it streamlines processes, particularly in complex fields like clinical trials, enhancing communication and saving time and costs. Educating users on package utilization is essential for realizing these benefits effectively."

THANK YOU

LISTEN, DEVISE, **BREAKTHROUGH**

