Today's Agenda

- Describe ODS Basic "sandwich" invocation and some other basic information.
- Describe ODS "greatest hits" – the destinations, features, and options that are essential for the ODS "rock star" to know.
- PDF of slides available +
- Zip file of programs available at:

http://support.sas.com/rnd/papers

rnd

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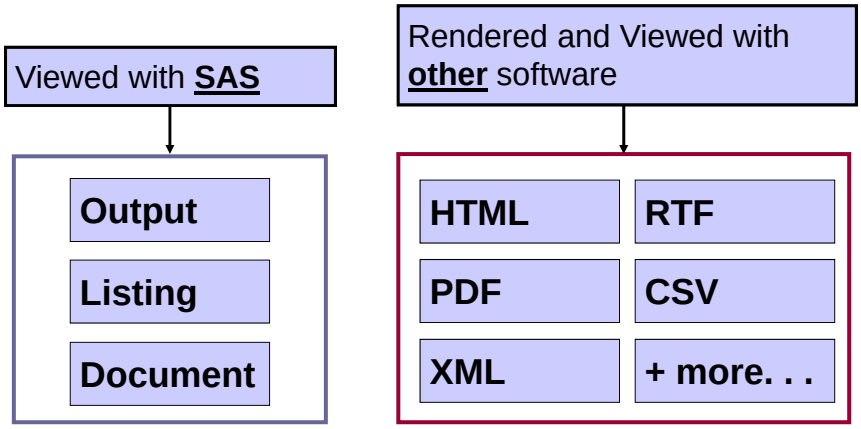
ODS Basics

The three main ODS destinations are: RTF, PDF, and HTML. Other ODS destinations are: PRINTER, MSOFFICE2K, CSVALL, CSV, LaTeX, TAGSETS.EXCELXP and more.



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ODS "Sandwich" Invocation

Basic ODS invocation is a “sandwich” technique, similar to using PROC PRINTTO in the “old” days.

```
ODS destination FILE='file-name.ext'
                STYLE=style-name;

  SAS code to generate a report

ODS destination CLOSE;
```

4

ODS Basics

If you open a destination, you must close the same destination (or use ODS _ALL_ CLOSE;)

```
ODS RTF FILE='file-name.RTF' ;
  SAS code to generate a report
ODS RTF CLOSE;
ODS _ALL_ CLOSE;
```

...

5

ODS and Step Boundaries

To get the correct output, step boundaries must be included within the ODS invocation “sandwich”.

```
ODS PDF FILE='file-name.PDF' ;

PROC whatever data=data-set-name;
RUN;

PROC gwhatever data=data-set-name;
RUN;
QUIT;

ODS PDF CLOSE;
```

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You Never Done It Like That Yesterday

SAS System Options are supported differently by different destinations.

	HTML	PDF	RTF
DATE | NODATE		✓	✓
NUMBER | NONUMBER		✓	✓
PAGENO=		✓	✓
ORIENTATION=		✓	✓
CENTER | NOCENTER	✓	✓	✓
TOPMARGIN=		✓	✓ 9.2
BOTTOMMARGIN=		✓	✓ 9.2
LEFTMARGIN=		✓	✓ 9.2
RIGHTMARGIN=		✓	✓ 9.2

You Never Done It Like That by The Captain & Tenille (1978)
Yesterday by The Beatles (1965);

7

And Now. . . The Hits

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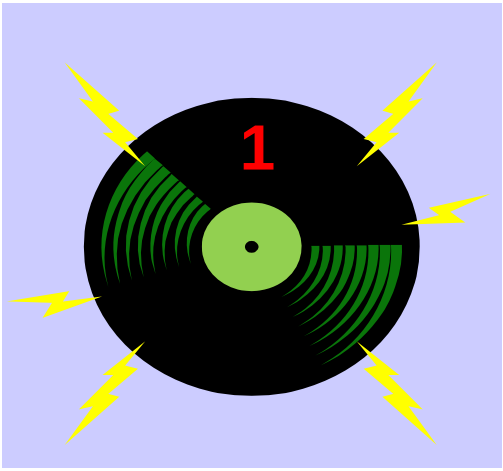
#1 Output Objects



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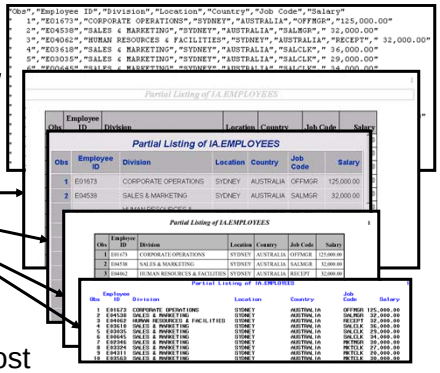
ODS Creates Output Objects

Most SAS procedures create output objects, and these output objects are then routed to an ODS destination.

SAS process or procedure creates one or more output objects.

Output Objects



Output object(s) is composed of a data component and, for most procedures, a template component.

ODS statements route object(s) to destination.

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The Name Game

In order to play "what's your name" with ODS OUTPUT objects, you must use ODS TRACE

```
ODS TRACE ON/ LABEL;

PROC SORT
RUN;

PROC REG D
  MODEL AG
RUN; QUIT;

ODS TRACE
```

```
Output Added:
-------------
Name:         NObs
Label:        Number of Observations
Template:     Stat.Reg.NObs
Path:         Reg.MODEL1.Fit.Age.NObs
Label Path:   'The Reg Procedure'.'MODEL1'.'Fit'.Age.'Number of Observations'
-------------

Output Added:
-------------
Name:         ANOVA
Label:        Analysis of Variance
Template:     Stat.REG.ANOVA
Path:         Reg.MODEL1.Fit.Age.ANOVA
Label Path:   'The Reg Procedure'.'MODEL1'.'Fit'.Age.'Analysis of Variance'
-------------

Output Added:
-------------
Name:         FitStatistics
Label:        Fit Statistics
Template:     Stat.REG.FitStatistics
Path:         Reg.MODEL1.Fit.Age.FitStatistics
Label Path:   'The Reg Procedure'.'MODEL1'.'Fit'.Age.'Fit Statistics'
-------------

Output Added:
-------------
Name:         ParameterEstimates
Label:        Parameter Estimates
Template:     Stat.REG.ParameterEstimates
Path:         Reg.MODEL1.Fit.Age.ParameterEstimates
Label Path:   'The Reg Procedure'.'MODEL1'.'Fit'.Age.'Parameter Estimates'
-------------
```

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You Belong To . . .

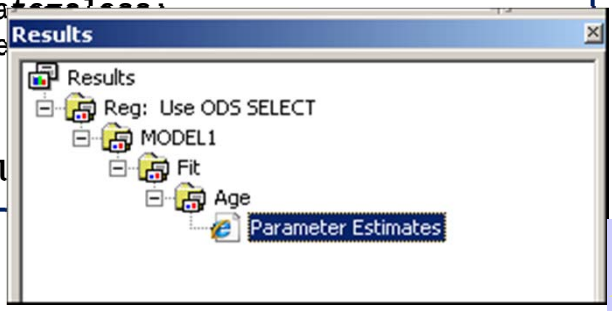
To select output objects for a particular ODS destination once you know the object name, use the ODS SELECT statement.

```
ods html file='sel_parm.html' style=sasweb;

ods html select ParameterEstimates;

proc reg da
  model age
run;
quit;

ods html cl
```



You Belong to Me by The Duprees (1962)

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Return to Sender

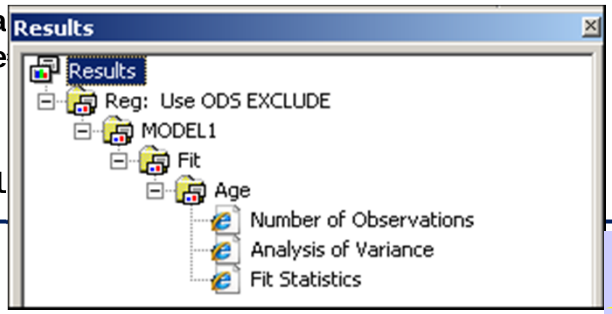
You can also exclude an output object from a destination by using the ODS EXCLUDE statement.

```
ods html file='excl_parm.html' style=sasweb;

ods html exclude ParameterEstimates;

proc reg da
  model age
run;
quit;

ods html cl
```



Return to Sender by Elvis Presley (1962)

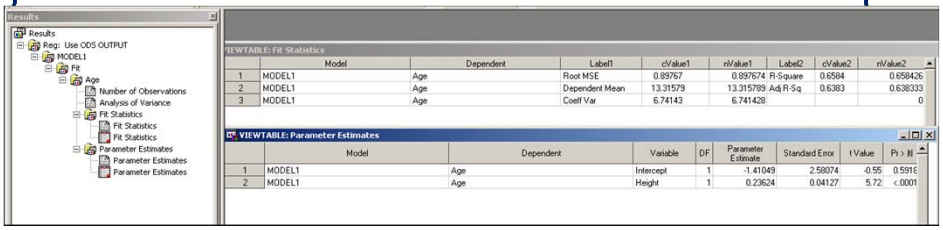
13

Come And Get It

You can also use the ODS OUTPUT statement to create SAS datasets from ODS output objects.

```
ods listing;

ods output ParameterEstimates=work.parmest
           FitStatistics=work.fitstat;
```



Come And Get It by Badfinger (1969)

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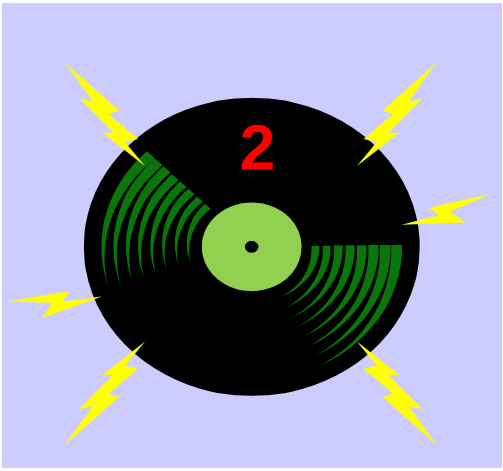
#2 Send Email



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Please Mr. Postman

If your system is configured for e-mailing from within a SAS program, you can email your ODS results.

```
ods rtf body='c:\temp\class.rtf' rs=none style=sasweb;
 . . . SAS code to Generate Report . . .
ods rtf close;

filename doemail email
 to=('one.person@sas.com' 'another.person@sas.com')
 from='ima.programmer@sas.com'
 cc=('also.interested@sas.com')
 subject='Look at this ODS RTF report'
 attach='c:\temp\class.rtf';

data _null_;
    file doemail;
    put 'This is a test email with an RTF attachment.';
run;
```

Please Mr. Postman by The Marvelettes (1961)

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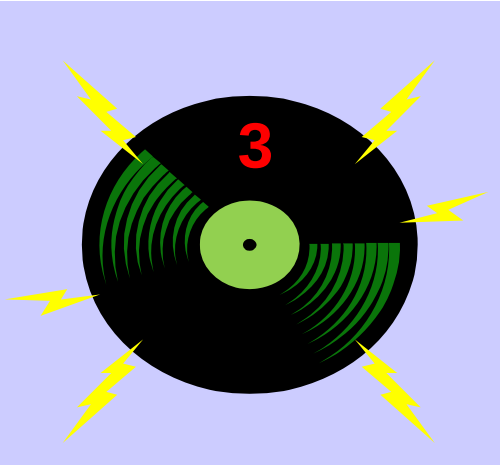
#3 Control What You Create



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Step by Step

You can created multiple output files using the NEWFILE= option.

ODS *destination* **FILE = '***file-specification***'**
NEWFILE = *starting-point* **;**

Starting-point	Creates
NONE	a single output file (default)
PROC	a new file for each new procedure step
OUTPUT	a new file for each output object
BYGROUP	a new file for each BY group
PAGE	a new file when a new page is explicitly generated

Step By Step The Crests (1960)

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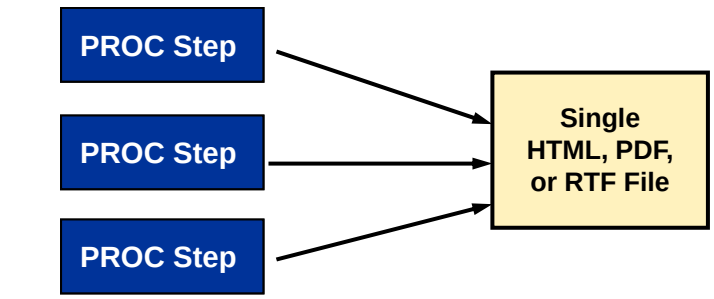
NEWFILE=NONE is the Default

By default, ODS routes all procedure output from one ODS invocation into one file.

```
ods destination file = 'report.ext';
```




```
ods destination close;
```

Step By Step The Crests (1960)

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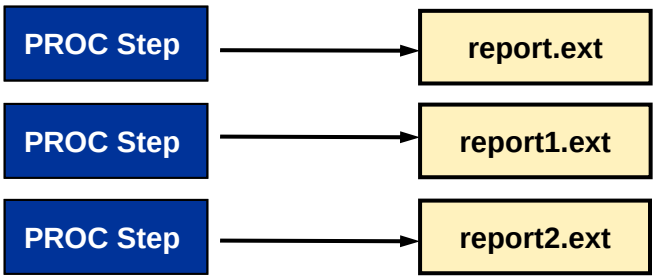
Using the NEWFILE= Option

When you use the NEWFILE= option, ODS creates numbered output files by either adding a number to the filename or incrementing the right-most number if the filename contains a number.

```
ods destination file = 'report.ext'
                newfile = proc;
```




```
ods destination close;
```

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I Go To Pieces

You can also create multiple output files for the SAME destination by using the ID= suboption. The (ID=) suboption

- is not supported for the LISTING destination
- must go directly after the destination name
- must be enclosed in parentheses
- can have a value that is either a name or a number
- can be specified without the ID= portion of the suboption.

All of these are valid (ID=) suboption values:

```
ods html(id=1) file='file1.html' style=sasweb;
ods html(id=two) file='file2.html' style=ocean;
ods html(3) file='file3.html' style=harvest;
```

I Go To Pieces by Peter & Gordon (1965)

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Using the ID= Suboption

Three output files are created with this code:

```
ods html(id=1) file='file1.html' style=sasweb;
ods html(id=two) file='file2.html' style=ocean;
ods html(3) file='file3.html' style=harvest;

  proc report data=employees nowd split='#';
     title 'Report 1 ID= Behavior';
  run;

ods html(id=two) close;

  proc report data=employees nowd split='#';
     title 'Report 2 ID= Behavior';
  run;

ods html(id=1) close;
ods html(3) close;
```

Closing this instance of the HTML destination means the file will only have output from the first PROC REPORT step.

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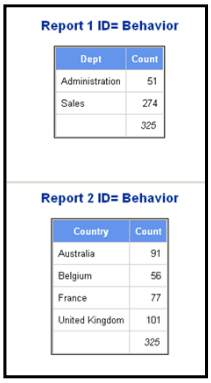
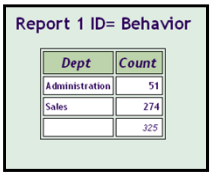
Using the ID= Suboption

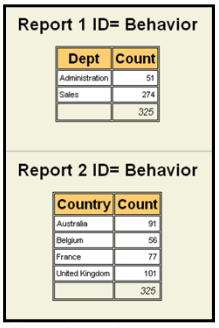
Three output files are created:



file1.html



file2.html



file3.html

```
ods html(id=1) file='file1.html' style=sasweb;
ods html(id=two) file='file2.html' style=ocean;
ods html(3) file='file3.html' style=harvest;
```

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It's Not Unusual To Need Contents

The CONTENTS= option will generate a separate table of contents page in RTF and PDF output.

- By default, the CONTENTS= option value is NO. (OFF and ON are alternatives to NO and YES, respectively.)
- In PDF output, the CONTENTS= option automatically inserts a Table of Contents page that is visible in Acrobat Reader.
- In RTF output, Table of Contents creation might be different for each Word processor that renders the file. In SAS 9.2, you must use the TOC_DATA option when you specify CONTENTS=YES.

It's Not Unusual by Tom Jones (1965)

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Using the CONTENTS= Option

The following code turns on the CONTENTS= option for RTF and PDF destinations:

```
ods rtf file='toc.rtf' contents=yes toc_data;
ods pdf file='toc.pdf' contents=yes;
ods noptitle;

  <additional SAS statements>
ods _all_ close;
```

Starting in SAS 9.2, you need to turn on the creation of TOC links with the TOC_DATA option in RTF.

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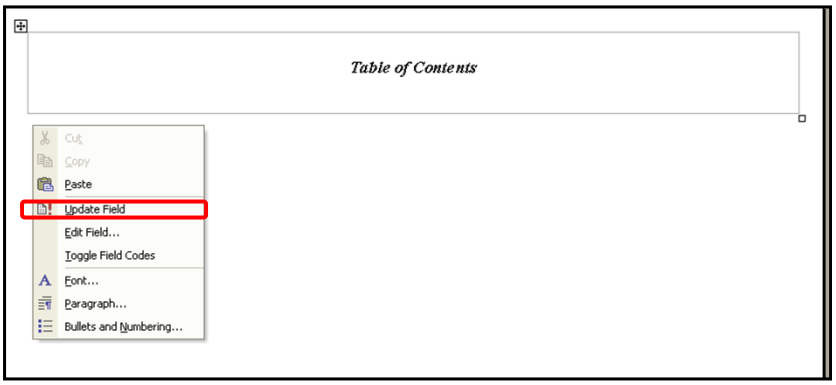
RTF Results CONTENTS= Option

In Microsoft Word, when you open the file, you will not immediately see the content list, only the header. To build the Table of Contents, you must position your mouse underneath the header and right-click to select **Update Field**.



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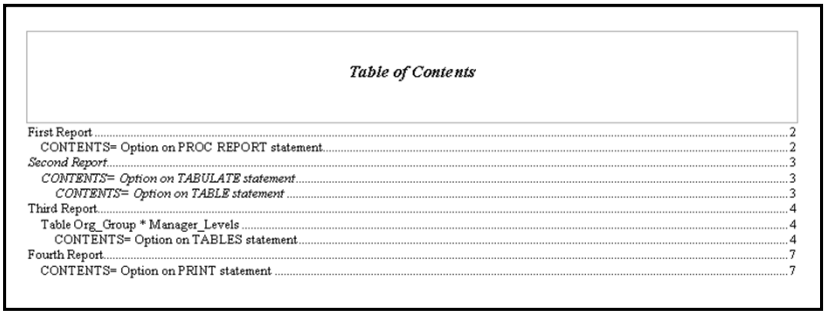
RTF Results CONTENTS= Option

The Table of Contents creation method might vary using different word processors.



Note how the ODS PROCLABEL statement and the procedure-specific CONTENTS= option affected the Table of Contents for the RTF file.

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NOTOC_DATA Option

In SAS 9.2, the insertion of contents information is turned **off** by default. With the NOTOC_DATA option, control characters are **not** inserted and you will **not** see formatting information. With the TOC_DATA option, control characters **are** inserted and you **will** see formatting information in the RTF file if you turn Show/Hide Characters on..


```
ods rtf file='seetoc.rtf' toc_data;
```

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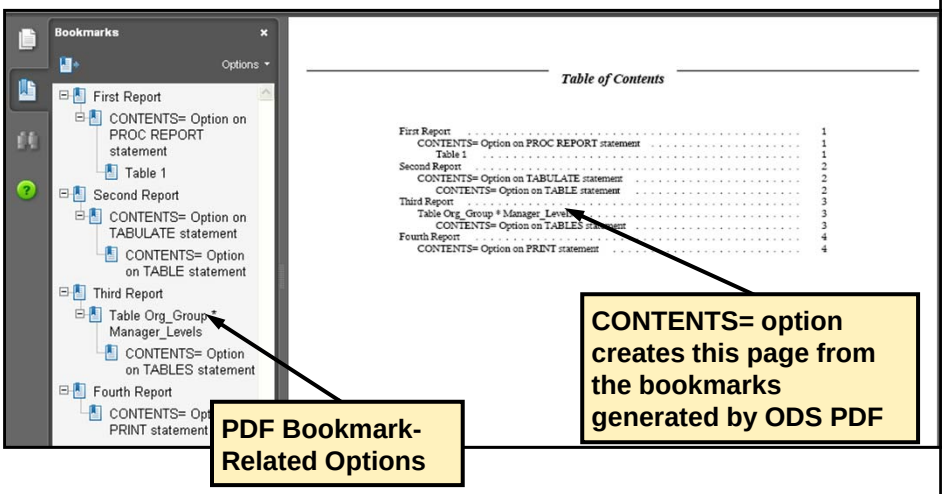
PDF Results CONTENTS= Option

Partial output showing Table of Contents page and Bookmark tab in Acrobat Reader:



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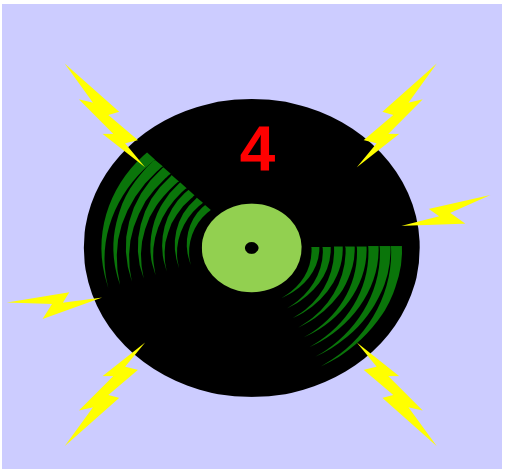
#4 ODS ESCAPECHAR



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Writing On The Wall

You can enhance your ODS output by using ODS ESCAPECHAR functions. Several popular functions generate Page X of Y page numbers for RTF and PDF output by using an ODS escape character with the {THISPAGE} and {LASTPAGE} functions.

The ODS ESCAPECHAR= statement declares an escape character that is used to introduce special sequences.

General form of the ODS ESCAPECHAR= statement:

ODS ESCAPECHAR = '*escape-character* **' ;**

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The Writing on the Wall by Adam Wade (1961)

Page Numbering

```
ods escapechar='#';

ods pdf file='pg_xofy.pdf';
ods rtf file='pg_xofy.rtf';

proc report data=employees nowd;
  ...
  footnote1 '-- #{thispage} --';
  footnote2 j=r 'Page #{thispage} of #{lastpage}';
run;

ods _all_ close;
```

Sales	Daniel Pilgrim	Male	$36,605

-- 3 --

Page 3 of 11

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Producing Page X of Y with RTF

In addition to {THISPAGE} and {LASTPAGE} functions, the RTF destination has the {PAGEOF} function available beginning in SAS®9.

The syntax to accomplish this kind of page numbering for ODS RTF is as follows:

```
options nodate nonumber;

ods rtf file='pageof.rtf';
ods escapechar '#';
title 'In The Title'  j=r  'Page #{pageof}';
footnote j=l 'Page #{pageof}'
         j=c 'In the Footnote';
   ...SAS code to produce output...
ods rtf close;
```

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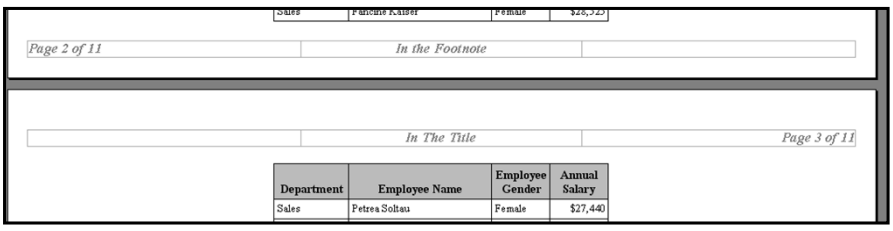
The RTF {PAGEOF} Escape Character String

The results from using {PAGEOF} in the TITLE and FOOTNOTE statements are as follows:

```
footnote j=l 'Page #{pageof}'
         j=c 'In the Footnote';
```




```
title 'In The Title'  j=r  'Page #{pageof}';
```

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More About ODS ESCAPECHAR

Examples of ODS ESCAPECHAR statement:

```
ods escapechar = '!';
ods escapechar = '~';
ods escapechar = '^';
ods escapechar = '#';
```

The ODS ESCAPECHAR statement can be omitted entirely if you use one of the following as the escape character:

- '03'x
- (*ESC*)

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Selected ESCAPECHAR Functions

	HTML	PDF	RTF
{super *text***}**	✓	✓	✓
{sub *text***}**	✓	✓	✓
{dagger}	✓	✓	✓
{thispage}		✓	✓
{lastpage}		✓	✓
{pageof}			✓
{unicode}	✓	✓	✓
{style}	✓	✓	✓

ESCAPECHAR syntax is different in SAS 9.1.3 versus SAS 9.2 – however the page numbering functions work the same way in both version of SAS. For syntax to change style in 9.2, consult the documentation. For 9.1.3, consult user group papers.

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Logos with PREIMAGE and ESCAPECHAR

You can insert images into output using the PREIMAGE style attribute:

Using a Logo

Region	Subsidiary	Product	Sales
North America	Cosmetic Products	HairGro Lotion	1,355,795

```
ods html file='demo04.html' style=sasweb;
ods rtf file='demo04.rtf';
ods pdf file='demo04.pdf';
ods escapechar='~';

proc report data=salesdata nowd;
  title j=l "~S={preimage='sgf_2011_banner.jpg'}";
  title2 'Using a Logo';
. . . More code . . .
ods _all_ close;
```

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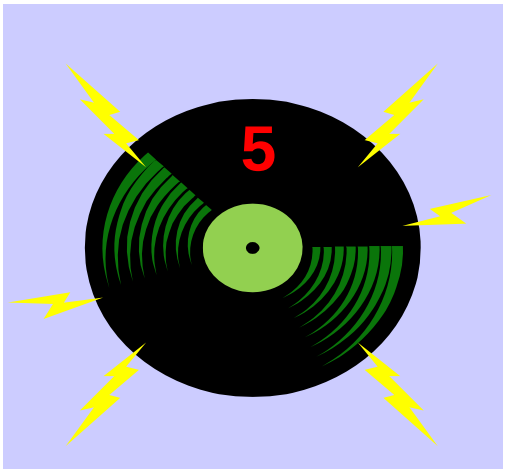
#5 Send Output to Excel



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You Don't Know What You've Got

There are 3 methods to create files which can be opened and rendered with Excel. These ODS destinations all create ASCII text files.

1. ODS CSV, ODS CSVALL create CSV text files
2. ODS HTML, ODS MSOFFICE2K ,
   ODS MSOFFICE2K_X and
   ODS TAGSETS.TABLEEDITOR create HTML text files
3. ODS TAGSETS.EXCELXP creates Spreadsheet

None of these methods create true, binary Excel files.

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You Don't Know What You've Got by Ral Donner (1961)

Happy Together

ODS MSOFFICE2K and ODS TAGSETS.EXCELXP were designed to conform to Microsoft specifications for HTML and XML respectively.

```
ods html file='toExcel_ht4.html' style=sasweb;
ods msoffice2k file='toExcel_mso.html'
    style=sasweb;
ods tagsets.excelxp file='toExcel_xp.xml'
    style=sasweb;
ods csvall file='toExcel_comma.csv';

<additional SAS statements>

ods _all_ close;
```

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Happy Together by The Turtles (1967)

Style Rendering by Excel

Compare how ODS style information is used differently by Excel.

PROC PRINT

Obs	Region	Product	Subsidiary	Stores	Sales	Inventory	Returns
1	Africa	Boot	Addis Ababa	12	$29,761	$191,821	$769
2	Africa	Men's Casual	Addis Ababa	4	$67,242	$118,036	$2,284
3	Africa	Men's Dress	Addis Ababa	7	$76,793	$136,273	$2,433
4	Africa	Sandal	Addis Ababa	10	$62,819	$204,284	$1,861
5	Africa	Slipper	Addis Ababa	14	$68,641	$279,795	$1,771

PROC FREQ

Product	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Boot	52	13.16	52	13.16
Men's Casual	45	11.39	97	24.56
Men's Dress	50	12.66	147	37.22
Sandal	49	12.41	196	49.62
Slipper	52	13.16	248	62.78
Sport Shoe	51	12.91	299	75.7
Women's Casual	45	11.39	344	87.09
Women's Dress	51	12.91	395	100

ODS HTML Output Rendered in Excel

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Unhappy Together

Compare how ODS style information is used differently by Excel.

PROC PRINT

Obs	Region	Product	Subsidiary	Stores	Sales	Inventory	Returns
1	Africa	Boot	Addis Ababa	12	$29,761	$191,821	$769
2	Africa	Men's Casual	Addis Ababa	4	$67,242	$118,036	$2,284
3	Africa	Men's Dress	Addis Ababa	7	$76,793	$136,273	$2,433
4	Africa	Sandal	Addis Ababa	10	$62,819	$204,284	$1,861
5	Africa	Slipper	Addis Ababa	14	$68,641	$279,795	$1,771

PROC FREQ

Product	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Boot	52	13.16	52	13.16
Men's Casual	45	11.39	97	24.56
Men's Dress	50	12.66	147	37.22
Sandal	49	12.41	196	49.62
Slipper	52	13.16	248	62.78
Sport Shoe	51	12.91	299	75.7
Women's Casual	45	11.39	344	87.09
Women's Dress	51	12.91	395	100

ODS HTML Output Rende

ODS MSOFFICE2K Output Rendered in Excel

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Comma Separated Values

Comma-separated values are rendered without any style by Excel because ODS does not write any style information in the CSV file.

toExcel_comma.csv - Notepad

File Edit Format View Help

```
PROC PRINT

"Obs","Region","Product","Subsidiary","Stores","Sales","Inventory","Returns"
"1","Africa","Boot","Addis Ababa",12,"$29,761","$191,821","$769"
"2","Africa","Men's Casual","Addis Ababa",4,"$67,242","$118,036","$2,284"
"3","Africa","Men's Dress","Addis Ababa",7,"$76,793","$136,273","$2,433"
"4","Africa","Sandal","Addis Ababa",10,"$62,819","$204,284","$1,861"
"5","Africa","Slipper","Addis Ababa",14,"$68,641","$279,795","$1,771"

PROC FREQ

"Product","Frequency","Percent","Cumulative Frequency","Cumulative  Percent"
"Boot",52,13.16,52,13.16
"Men's Casual",45,11.39,97,24.56
"Men's Dress",50,12.66,147,37.22
"Sandal",49,12.41,196,49.62
"Slipper",52,13.16,248,62.78
"Sport Shoe",51,12.91,299,75.70
"Women's Casual",45,11.39,344,87.09
"Women's Dress",51,12.91,395,100.00
```

ODS CSVALL Output Viewed in Notepad

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Comma Separated Values

Comma-separated values are rendered without any style by Excel because ODS does not write any style information in the CSV file.

toExcel_comma.csv - Notepad

File Edit Format View Help

```
PROC PRINT

"Obs","Region","Product","Subs
"1","Africa","Boot","Addis Aba
"2","Africa","Men's Casual","A
"3","Africa","Men's Dress","Ad
"4","Africa","Sandal","Addis A
"5","Africa","Slipper","Addis

PROC FREQ

"Product","Frequency","Percent
"Boot",52,13.16,52,13.16
"Men's Casual",45,11.39,97,24.
"Men's Dress",50,12.66,147,37.
"Sandal",49,12.41,196,49.62
"Slipper",52,13.16,248,62.78
"Sport Shoe",51,12.91,299,75.7
"Women's Casual",45,11.39,344,
"Women's Dress",51,12.91,395,1
```

	A	B	C	D	E	F	G	H	I
1	PROC PRINT								
2									
3	Obs	Region	Product	Subsidiary	Stores	Sales	Inventory	Returns	
4	1	Africa	Boot	Addis Aba	12	$29,761	$191,821	$769	
5	2	Africa	Men's Cas	Addis Aba	4	$67,242	$118,036	$2,284	
6	3	Africa	Men's Dre	Addis Aba	7	$76,793	$136,273	$2,433	
7	4	Africa	Sandal	Addis Aba	10	$62,819	$204,284	$1,861	
8	5	Africa	Slipper	Addis Aba	14	$68,641	$279,795	$1,771	
9									
10	PROC FREQ								
11									
12	Product	Frequency	Percent	Cumulativ	Cumulative	Percent			
13	Boot	52	13.16	52	13.16				
14	Men's Cas	45	11.39	97	24.56				
15	Men's Dre	50	12.66	147	37.22				
16	Sandal	49	12.41	196	49.62				
17	Slipper	52	13.16	248	62.78				
18	Sport Sho	51	12.91	299	75.7				
19	Women's	45	11.39	344	87.09				
20	Women's	51	12.91	395	100				
21									

ODS CSVALL Output Rendered in Excel

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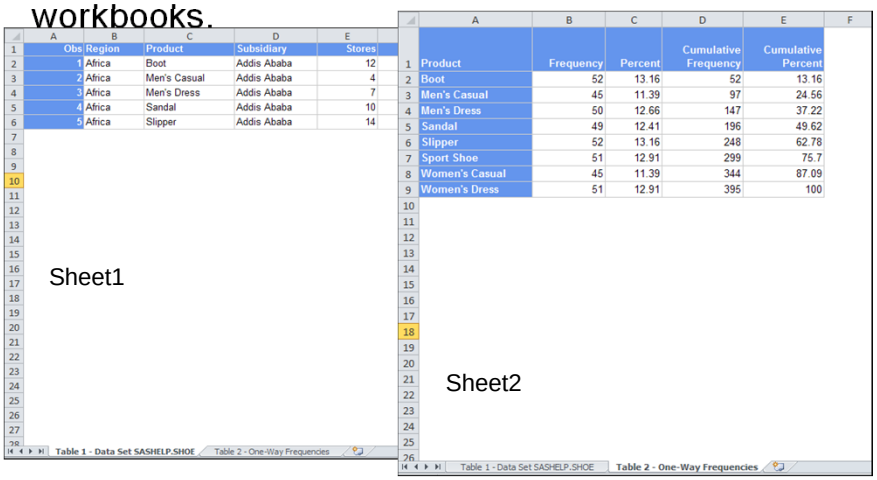
Spreadsheet Markup Language XML

The type of XML created by TAGSETS.EXCELXP allows Excel to render ODS output as multi-sheet workbooks.



Obs	Region	Product	Subsidiary	Stores
1	Africa	Boot	Addis Ababa	12
2	Africa	Men's Casual	Addis Ababa	4
3	Africa	Men's Dress	Addis Ababa	7
4	Africa	Sandal	Addis Ababa	10
5	Africa	Slipper	Addis Ababa	14

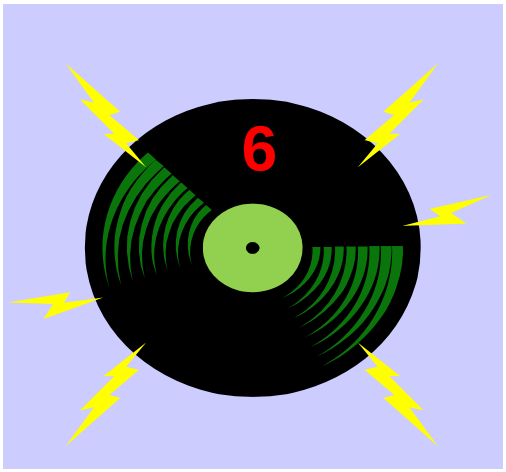
Sheet1

Product	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Boot	52	13.16	52	13.16
Men's Casual	45	11.39	97	24.56
Men's Dress	50	12.66	147	37.22
Sandal	49	12.41	196	49.62
Slipper	52	13.16	248	62.78
Sport Shoe	51	12.91	299	75.7
Women's Casual	45	11.39	344	87.09
Women's Dress	51	12.91	395	100

Sheet2

45

#6 ODS DOCUMENT



46

Any Way You Want It

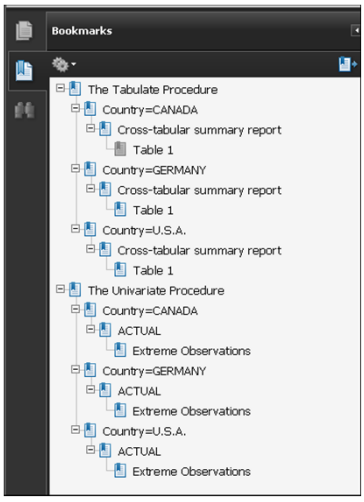
ODS DOCUMENT destination allows you to rearrange and replay ODS document objects to open ODS destinations. You can use the ODS DOCUMENT window to drag and drop output objects into a new structure or you can use PROC DOCUMENT syntax to rearrange and replay your output.

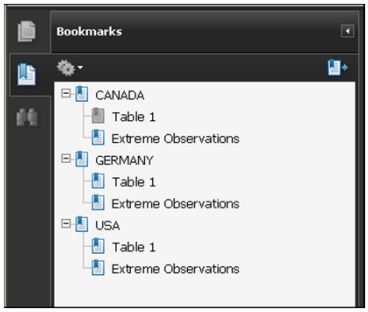
Any Way You Want It by the Dave Clark Five (1965)

47

ODS PDF Before and After

Using ODS DOCUMENT and PROC DOCUMENT allowed the new structure to be created and replayed:





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Original Code

The original program code:

```
ods document name=work.prddoc(write);
ods pdf file='c:\temp\origoutput.pdf';
proc tabulate data=prdsale;
  by Country;
  var predict;
  class prodtype;
  table prodtype all,
        predict*(min mean max);
run;

ods select ExtremeObs;
proc univariate data=prdsale;
  by Country;
  var actual;
run;
ods document close;
ods pdf close;
```

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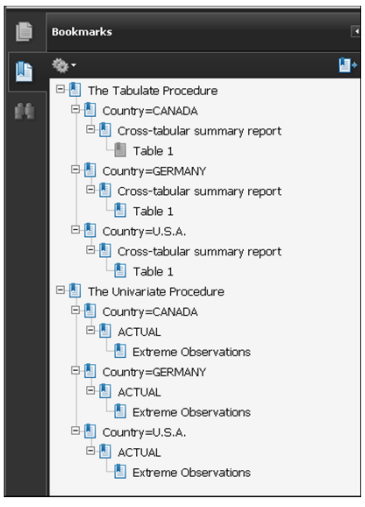
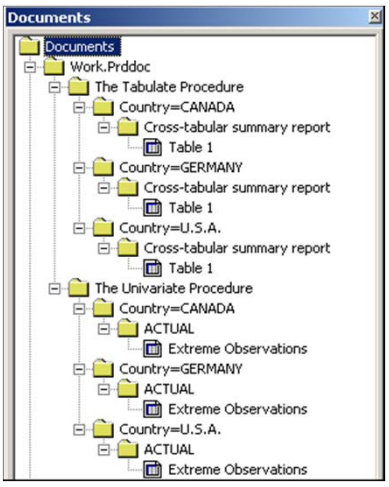
The Original Document Store

The original document store preserves the original output structure:





50

PROC DOCUMENT Code

The code to rearrange the output objects and write them to a new document store:

```
proc document name=work.neworder(write);
  make CANADA, GERMANY, USA;
run;
  dir ^^;
  dir CANADA;
  dir;
  copy \work.prddoc\Tabulate#1\ByGroup1#1\Report#1\Table#1 to ^;
  copy \work.prddoc\Univariate#1\ByGroup1#1\ACTUAL#1\ExtremeObs#1 to ^ ;
run;
  dir ^^;
  dir GERMANY;
  dir;
  copy \work.prddoc\Tabulate#1\ByGroup2#1\Report#1\Table#1  to ^ ;
  copy \work.prddoc\Univariate#1\ByGroup2#1\ACTUAL#1\ExtremeObs#1 to ^ ;
run;
  dir ^^;
  dir USA;
  dir;
  copy \work.prddoc\Tabulate#1\ByGroup3#1\Report#1\Table#1 to ^ ;
  copy \work.prddoc\Univariate#1\ByGroup3#1\ACTUAL#1\ExtremeObs#1 to ^ ;
run;
quit;
```

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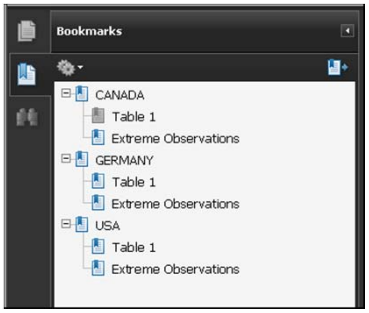
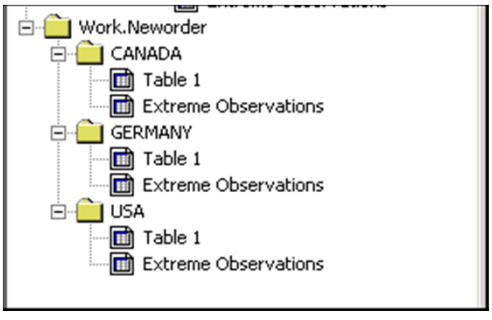
New Document Store

The rearranged output objects reflect the new structure in the document store and in the PDF output (or in the Results Window or any Table of Contents):





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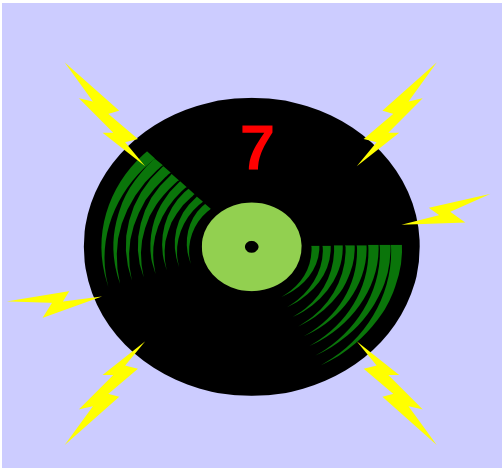
#7 SAS/GRAPH and ODS GRAPHICS



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Pictures At An Exhibition

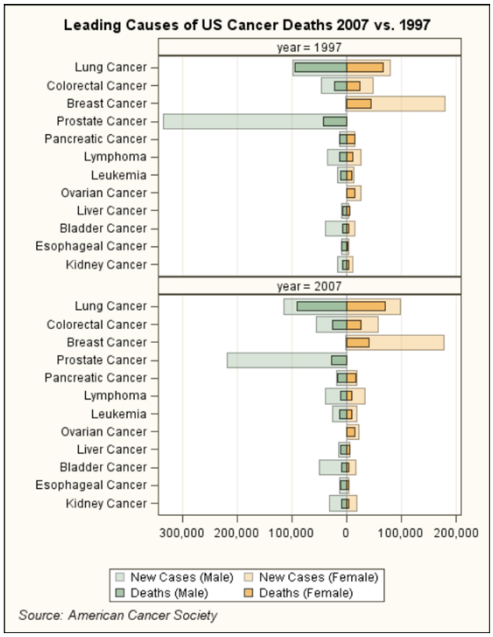
You can use SAS/GRAPH images, ODS GRAPHICS images and external images (like logos) in your ODS output files.

54

Pictures At an Exhibition by Emerson, Lake and Palmer (1972)

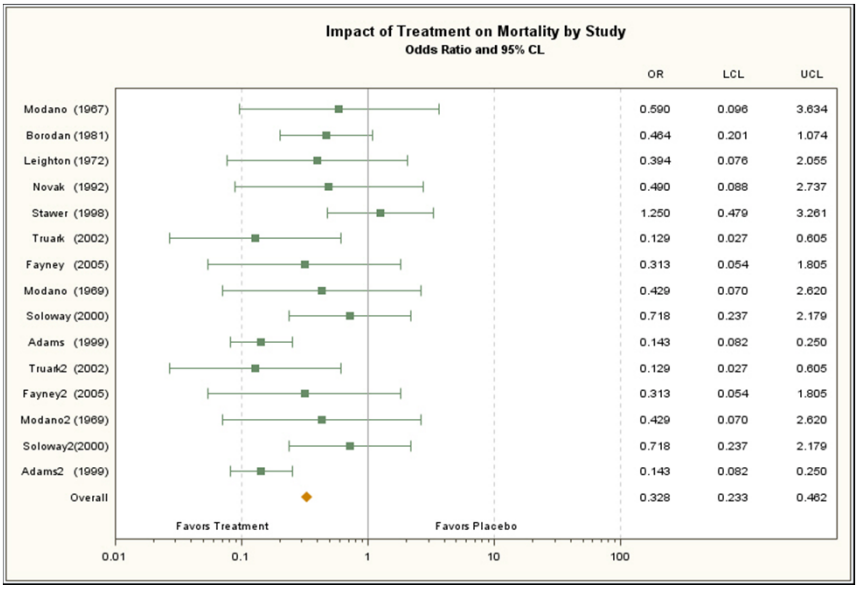
SGPANEL Example

Using SGPANEL, you can produce quite complex graphs without using ANNOTATE or GREPLAY:



55

Forest Plot with SGPLOT



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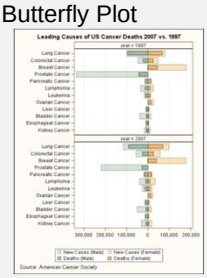
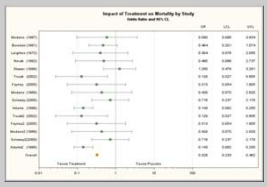
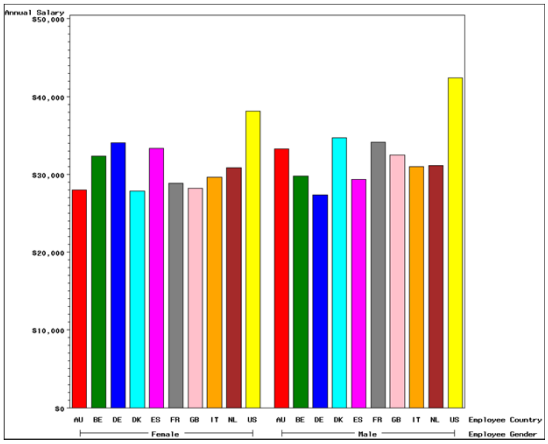
Statement Summary

Example	Uses
Butterfly Plot 	SGPANEL with 4 HBAR statements and a PANELBY statement
Forest Plot 	SGPLOT with 4 SCATTER statements, 2 REFLINE statements, XAXIS, X2AXIS and YAXIS statements and 2 INSET statements

57

SAS/GRAPH uses Style Templates

You can use STYLE templates to impact the style of classic device-based output without using GOPTIONS:




```
options nogstyle;
```

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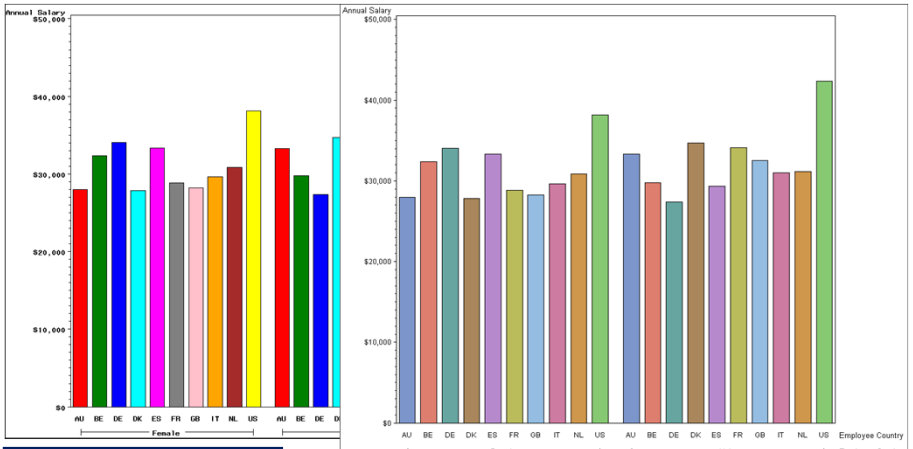
SAS/GRAPH uses Style Templates

You can use STYLE templates to impact the style of classic device-based output without using GOPTIONS:




```
options nogstyle;
```

```
options gstyle;
```

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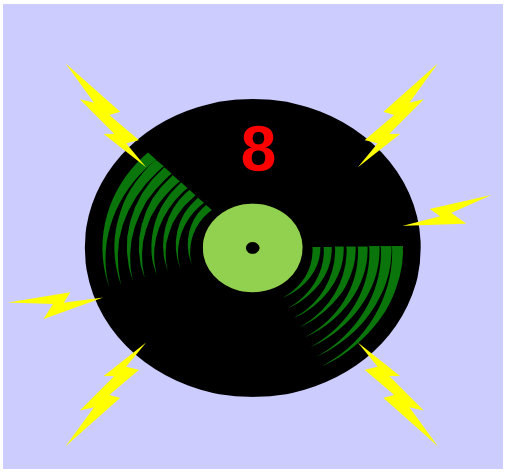
#8 Different Ways to Impact Style



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The Long And Winding Road to Style

There are many different ways to impact the style of ODS output:

- STYLE= option
- STYLESHEET= option for ODS HTML
- CSSSTYLE= option for ODS HTML, ODS RTF and ODS PDF (SAS 9.2)
- STYLE= statement level overrides for PROC PRINT, PROC REPORT, and PROC TABULATE
- SAS Style Templates

61 The Long and Winding Road by The Beatles (1970)

ODS Statement STYLE= Option

The STYLE= option is just one way to have an impact on ODS output. In destinations that support style, you can use the pre-defined STYLE template definitions to alter the default style used for output creation.

```
ods <destination> file='filename.ext'
style=sasweb;

<additional SAS statements>

ods
```

You can also define your own STYLE templates to use with ODS.

62 The Long and Winding Road by The Beatles (1970)

Default Behavior

In SAS 9, ODS HTML creates HTML 4.01 tags with an inline <STYLE> section:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01
Transitional//EN">
. . . More code . . .
<style type="text/css">
```

In SAS 8, ODS HTML created HTML 3.2 tags. In SAS 9, ODS HTML3 creates HTML 3.2 tags. HTML 3.2 specification allowed for font information to be embedded directly in the HTML:

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 Final//EN">
```

```
<TD ALIGN=LEFT bgcolor="#6495ED">
<font  face="Arial, Helvetica, sans-serif" size="2" color="#FFFFFF">
<b>Name</b></font></TD>
```

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Cascading Style Sheets

There are two primary ways to **use** Cascading Style Sheets:

- STYLESHEET=(URL=) options for ODS HTML
- CSSSTYLE= option for ODS HTML, ODS RTF and ODS PDF (SAS 9.2)

In addition, you can **create** a Cascading Style Sheet from a SAS Style template by using this syntax:

```
ods html path='.' (url=none) file='filename.html'
    style=sasweb stylesheet='make_sasweb.css';
<additional SAS statements>
ods html close;
```

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The Long and Winding Road by The Beatles (1970)

After Manually Changing the CSS File

sasweb_purple.css - Notepad

File Edit Format View Help

```
.Header
{
  font-family: Arial, Helvetica, sans-serif;
  font-size: x-small;
  font-weight: bold;
  font-style: normal;
  color: #FFFFFF;
  background-color: purple;
}
.HeaderEmphasis
{
  font-family: Arial, Helvetica, sans-serif;
  font-size: x-small;
  font-weight: normal;
  font-style: italic;
  color: #FFFFFF;
  background-color: purple;
}
.HeaderEmphasisFixed
{
  font-family: 'Courier New', Courier, monospace;
  font-size: x-small;
  font-weight: normal;
  font-style: italic;
  color: #FFFFFF;
  background-color: purple;
}
```

The changed CSS file shows that ALL the references to "#6495ED" have been changed to "purple". Then the CSS file is saved under and new name: sasweb_purple.css

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Using CSS Files

Once you have a CSS file, then you can use the CSS file with this syntax:

```
ods html path='.' (url=none)
         file='use_stylesheet.html'
         stylesheet=(url='sasweb_purple.css');

ods pdf file='.\use_cssstyle.pdf'
         cssstyle='.\sasweb_purple.css';
ods rtf file='.\use_cssstyle.rtf'
         cssstyle='.\sasweb_purple.css';
ods html(id=2) path='.' (url=none)
         file='use_cssstyle.html'
         cssstyle='sasweb_purple.css';
  . . . More code . . .
ods _all_ close;
```

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Reviewing the Results

Obs	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69.0	112.5
2	Alice	F	13	56.5	84.0
3	Barbara	F	13	65.3	98.0

PDF Output
(viewed in Acrobat Reader)

Obs	Name¤	Sex	Age	Height	Weight
1	Alfred¤	M¤	14	69.0	112.5¤
2	Alice¤	F¤	13	56.5	84.0¤
3	Barbara	F¤	13	65.3	98.0¤

RTF Output
(viewed in Word Print Preview mode)

HTML Output
(both viewed in Internet Explorer)

Obs	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69.0	112.5
2	Alice	F	13	56.5	84.0
3	Barbara	F	13	65.3	98.0

67

STYLE= Overrides

The PROC REPORT syntax for STYLE= overrides is very similar to the PROC PRINT syntax.

```
ODS HTML FILE='file-name.HTML' ;

PROC REPORT data=sashelp.class nowd
     style(header)={background=cx0000ff
                    foreground=cxffffff
                    font_face=Arial};
RUN;

ODS HTML CLOSE;
```

Name	Sex	Age	Height	Weight

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Other Types of STYLE= Overrides

Name	Sex	Age	Height	Weight
Alfred	M	14	69	112.5
Alice	F	13	56.5	84
Barbara	F	13	65.3	98

PROC REPORT Output

Box Area	Age						Count
	11	12	13	14	15	16	
Sex							
F	1	2	2	2	2	0	9
M	1	3	1	2	2	1	10
Total	2	5	3	4	4	1	19

PROC TABULATE Output

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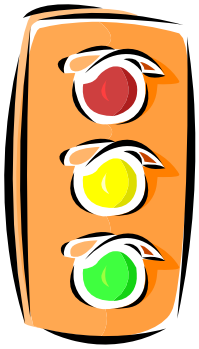
Traffic Lighting with Style Overrides

Traffic lighting is highlighting individual cells based on the cell's value. With CALL DEFINE, you can highlight cells, rows or columns based on multiple values.



Example:

Red for bad results.

Yellow for neutral results.

Green for good results.

70

Adding Traffic Lighting with Formats

Two items must be completed in order to modify individual cells within a column:

1. Create a format referencing the style attribute values with PROC FORMAT.
2. Refer to the format in the STYLE option in PROC REPORT for the appropriate column.

71

Adding Traffic Lighting

Create the format with the appropriate value for the style attribute you want to change.

1

```
proc format;
   value tlite low -<750000 = 'light red'
           750000 - 1200000 = 'light yellow'
         1200000<- 2000000  = 'light green'
                      other = 'cx6495ED';
run;
```

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Traffic Lighting with Format

Refer to the format in the STYLE= option or CALL DEFINE:

Region	Subsidiary	Product	Sales
North America	Cosmetic Products	HairGro Lotion	1,355,795
		WrinkAway Creme	1,055,312
	OTC Remedies	Drizzle Nose Spray	1,235,135
		SleepTight Tablets	774,334
North America			*4,420,577*
	OTC Remedies	Drizzle Nose Spray	498,317
		SleepTight Tablets	383,055
South America			*2,116,197*

```
define Sales/ sum 'Sales' f=comma16.
       style(column)={background=tlite.}
```

73

SAS Style Templates

When you use SAS style templates to alter the look and feel of SAS output, you must use understand PROC TEMPLATE syntax specifically designed for style templates. A style template is a collection of style elements and each style element is a collection of style attributes.

74

The TEMPLATE Procedure

```
proc template;
   define style styles.newstyle;
   parent=styles.sasweb;

   end;
run;
```

In SAS 9.2, you do not have to worry about inheritance issues. When you use either the CLASS statement or the STYLE statement parent/child inheritance works in an intuitive fashion.

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Change All Headers

```
ods path work.tmp(update)
    sasuser.templat(update)
    sashelp.tmplmst(read);

proc template;
  define style styles.purple;
    parent=styles.sasweb;
    class Header /
       background=purple
       foreground=white;
  end;
run;
```

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Use Style Template

```
ods html file='purple.html' style=styles.purple;
ods rtf file='purple.rtf' style=styles.purple;
ods pdf file='purple.pdf' style=styles.purple;

ods select fitstatistics parameterestimates;
proc reg data=sashelp.class;
run;

ods select basicmeasures;
proc univariate data=sashelp.class;
run;

ods _all_ close;
```

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Change All Headers

```
proc template;
  define style styles
    parent=styles.sas
  e
run
```

```
ods html file='purp
ods rtf file='purpl
ods pdf file='purpl

ods select fitstati
proc reg data=sashe
run;

ods select basicmea
proc univariate dat
run;

ods _all_ close;
```

Root MSE	0.89767	R-Square	0.6584
Dependent Mean	13.31579	Adj R-Sq	0.6383
Coeff Var	6.74143		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-1.41049	2.58074	-0.55	0.5918
Height	1	0.23624	0.04127	5.72	<.0001

Variable: Height

Moments

N	19	Sum Weights	19
Mean	62.3368421	Sum Observations	1184.4
Std Deviation	5.12707525	Variance	26.2869006
Skewness	-0.2596696	Kurtosis	-0.1389692
Uncorrected SS	74304.92	Corrected SS	473.164211
Coeff Variation	8.22479143	Std Error Mean	1.17623173

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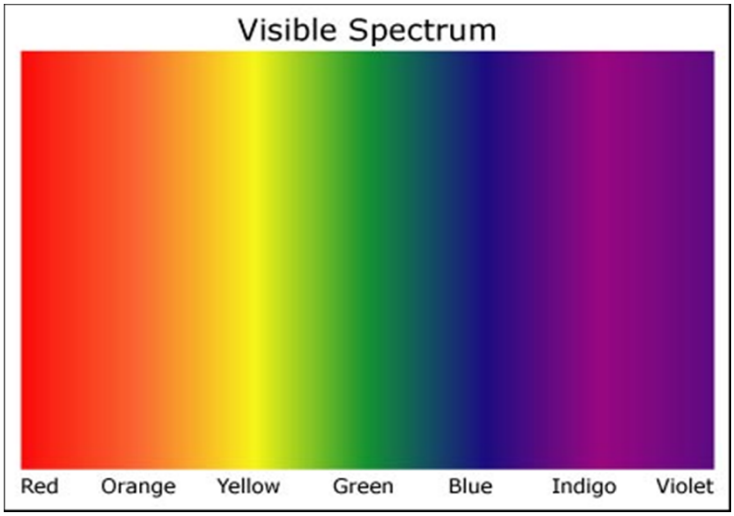
More About Colors



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Specifying Colors: It's Not Easy Being Green

You can specify color names using any combination of these common color-naming schemes, such as:

- RGB (red, green, blue) color values
- HLS (hue, lightness, saturation) values
- Gray scale color names
- SAS color names (from the SAS Registry)
- SAS Color Naming System (CNS)
- CMYK (cyan magenta yellow black)
- HSV (hue, saturation, brightness).

80

It's Not Easy Being Green by Kermit the Frog (1970)

Red Roses For A Blue Lady

Use the RGB color-naming scheme to specify a color in terms of its red, green, and blue components. Color names are of the form CX*rrggbb*, where

- CX indicates the RGB color specification
- *rr* is the red component
- *gg* is the green component
- *bb* is the blue component.

The components are given as hexadecimal numbers in the range 00 through FF. Most web page colors and output for the web use RGB color values.

81

Red Roses For A Blue Lady by Vic Dana (1965)

Hex Values Are Percentages

Hex Value	Decimal Value	Color Percent	Formula
FF	255	100%	255/255 = 1
CC	204	80%	204/255 = .8
99	153	60%	153/255 = .6
66	102	40%	102/255 = .4
33	51	20%	51/255 = .2
00	0%	0%	0/255 = 0

For example:

cxFF0000 = 100% red, 0% green, 0% blue

cx00FF00 = 0% red, 100% green, 0% blue

cx339966=20% red, 60% green, 40% blue

cxCCCCFF=40% red, 40% green, 100% blue

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RGB Color Examples

Some selected RGB colors are shown below:

		Percent Blue					
Percent Red	Percent Green	00 = 0%	33 = 20%	66 = 40%	99 = 60%	CC = 80%	FF = 100%
CC = 80%	00 = 0%	cxCC0000	cxCC0033	cxCC0066	cxCC0099	cxCC00CC	cxCC00FF
	33 = 20%	cxCC3300	cxCC3333	cxCC3366	cxCC3399	cxCC33CC	cxCC33FF
	66 = 40%	cxCC6600	cxCC6633	cxCC6666	cxCC6699	cxCC66CC	cxCC66FF
	99 = 60%	cxCC9900	cxCC9933	cxCC9966	cxCC9999	cxCC99CC	cxCC99FF
	CC = 80%	cxCCCC00	cxCCCC33	cxCCCC66	cxCCCC99	cxCCCCCC	cxCCCCFF
	FF = 100%	cxCCFF00	cxCCFF33	cxCCFF66	cxCCFF99	cxCCFFCC	cxCCFFFF

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HLS Color Scheme

HLS color names are of the form H*hhhllss*, where

- H indicates the HLS color specification
- *hhh* is the hue component
  - with a range from 0 to 360, expressed with values of 000 through 168 hexadecimal (168 hexadecimal is equivalent to 360 decimal)
- *ll* is the lightness component
- *ss* is the saturation component
  - the lightness and saturation components both use a range of 0 to 255, expressed with values of 00 through FF (0% to 100%) hexadecimal.

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Blue On Blue

Some selected HLS colors are shown below:

		Percent Saturation					
Hue Value	Percent Lightness	00	33	66	99	CC	FF
138	00	h1380000	h1380033	h1380066	h1380099	h13800CC	h13800FF
	33	h1383300	h1383333	h1383366	h1383399	h13833CC	h13833FF
	66	h1386600	h1386633	h1386666	h1386699	h13866CC	h13866FF
	99	h1389900	h1389933	h1389966	h1389999	h13899CC	h13899FF
	CC	h138CC00	h138CC33	h138CC66	h138CC99	h138CCCC	h138CCFF
	FF	h138FF00	h138FF33	h138FF66	h138FF99	h138FFCC	h138FFFF

Blue On Blue by Bobby Vinton (1963)

85

Gray-Scale Color Codes

Use gray-scale codes to specify colors in terms of gray components. Gray-scale color names are of the form GRAY*ll*, where

- *ll* is the lightness of the gray.

The lightness component is given as a hexadecimal number in the range 00 through FF. When the red, green and blue values are exactly the same, the color can also be expressed as a gray-scale color, which includes both black and white.

Color	Gray Scale Name	RGB Value	HLS Value
white (100% lightness)	GRAYFF	cxFFFFFF	H000FF00
black (0% lightness)	GRAY00	cx000000	H0000000
60% lightness	GRAY99	cx999999	H0009900

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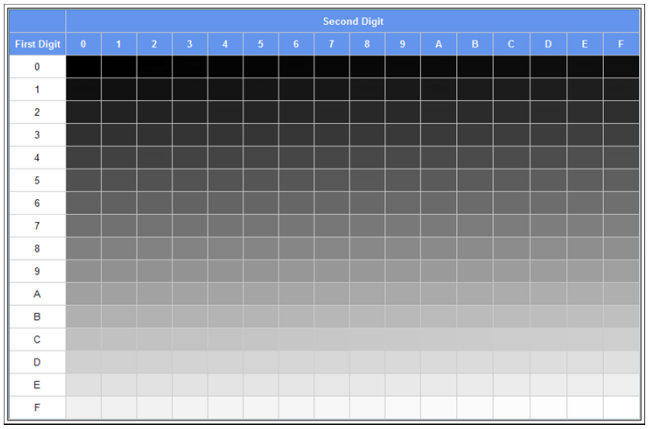
Paint It Black

The following table shows how the lightness values can be used to construct the GRAY*LL* color name:



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Paint It Black by The Rolling Stones (1966)

Yellow Submarine

To see the list of color words (like yellow, pink, green, blue, etc) that are defined in the SAS registry, use PROC REGISTRY code:

```
proc registry list
 startat="COLORNAMES";
run;
```

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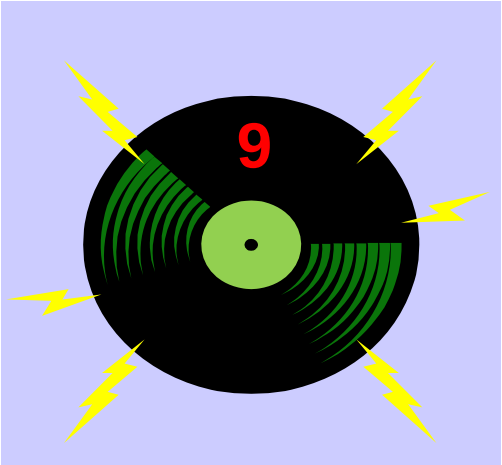
Yellow Submarine by the Beatles (1966)

#9 PROC TEMPLATE



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Templates: It's Now Or Never

PROC TEMPLATE has four basic syntax modes (with more on the way):

- TABLE templates
- STYLE templates
- TAGSET templates
- GRAPH templates
  - Used with SAS/STAT procedures
  - Graph Template Language
  - SG Procedures
  - ODS Graphics Designer

It's Now or Never by Elvis Presley (1960)

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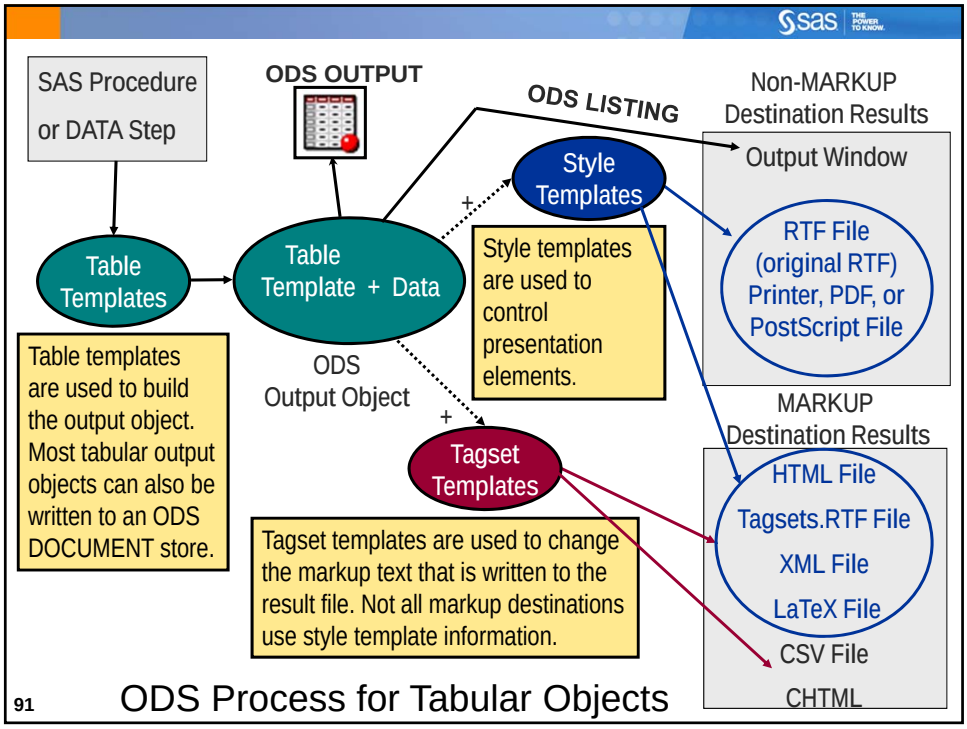
SAS Procedure or DATA Step
ODS OUTPUT
ODS LISTING
Non-MARKUP Destination Results
Output Window
Style Templates
RTF File (original RTF) Printer, PDF, or PostScript File
Table Templates
Table Template + Data
Style templates are used to control presentation elements.
Table templates are used to build the output object. Most tabular output objects can also be written to an ODS DOCUMENT store.
ODS Output Object
MARKUP Destination Results
Tagset Templates
HTML File
Tagsets.RTF File
XML File
LaTeX File
CSV File
CHTML
Tagset templates are used to change the markup text that is written to the result file. Not all markup destinations use style template information.
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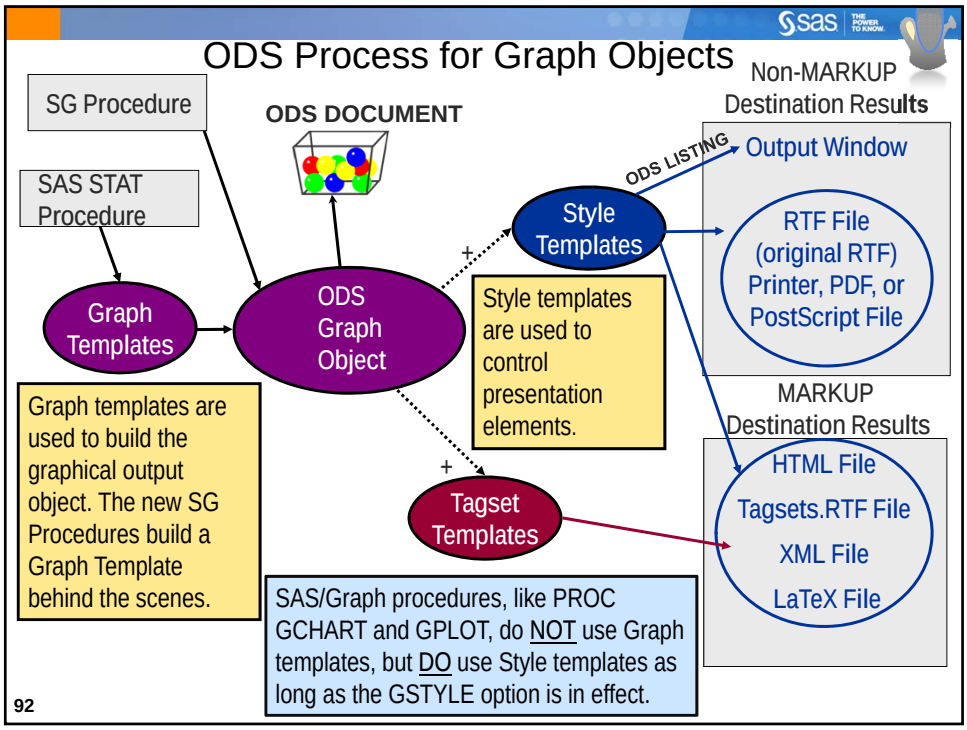
ODS Process for Tabular Objects


ODS Process for Graph Objects
SG Procedure
ODS DOCUMENT
Non-MARKUP Destination Results
SAS STAT Procedure
ODS LISTING
Output Window
Style Templates
RTF File (original RTF) Printer, PDF, or PostScript File
Graph Templates
ODS Graph Object
Style templates are used to control presentation elements.
Graph templates are used to build the graphical output object. The new SG Procedures build a Graph Template behind the scenes.
MARKUP Destination Results
Tagset Templates
HTML File
Tagsets.RTF File
XML File
LaTeX File
SAS/Graph procedures, like PROC GCHART and GPLOT, do NOT use Graph templates, but DO use Style templates as long as the GSTYLE option is in effect.
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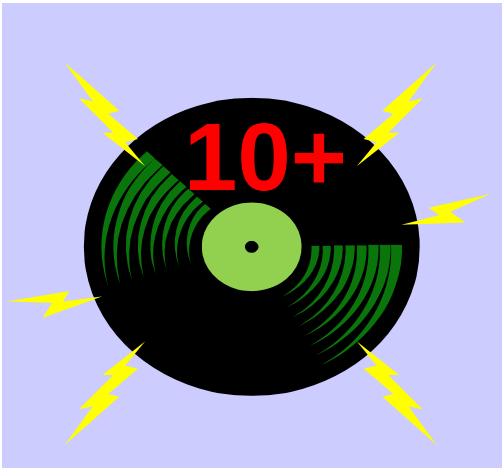
. . . And On The Horizon



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What's New Pussycat?

New features of ODS are continually being developed, such as:

- ODS LAYOUT
- ODS Object for DATA step
- ODS GRAPHICS support for SAS/STAT procedures (more procedures added every release)
- ODS GRAPHICS DESIGNER

What's New Pussycat ? by Tom Jones (1965)

94

I'm A Believer in ODS

I'm telling you now, that I'm a believer in ODS! And, all I really want to do here at the end of our road, is to get everybody talking about the good things in ODS.

And now that you've got what it takes to sing the praises of ODS, I hope to hear you say, "I'll try something new!"

I'm leaving it all up to you.

I'm Telling You Now by Freddie & The Dreamers (1965)
I'm a Believer by The Monkees (1966)All I Really Want To Do by Cher (1965)
The End Of Our Road by Gladys Knight & The Pips (1968)
Everybody's Talkin' by Nilsson (1969)
Good Thing by Paul Revere and the Raiders (1967)
You Got What It Takes by The Dave Clark Five (1967)
I'll Try Something New by Diana Ross & The Supremes (1969)
I'm Leaving It (All) Up To You by Donny & Marie Osmond (1974)

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It's Over

Ask me your questions!

?

It's Over by Roy Orbison (1964)
Ask Me by Elvis Presley (1964)

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About the Speaker

Speaker	**Cynthia Zender**
Company	**SAS Institute Inc.**
Telephone	**(919) 531-9012 (Mountain Time)**
Comments & E-Mail	**Cynthia.Zender@sas.com**

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