Version 9 ODS - Basics

Prepared by

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Overview of ODS

Procedural output may be routed to:

- A Data Set -- using a Data Step
- A Flat File -- using Proc printto
- A Graph -- using Proc gchart
- The Output Window -- default for Proc print

Programming capabilities include the use of Proc printto to direct Proc print output to a flat file. The Data _Null_ Step allows the Put statement to direct output to files without creating a data set.

These options are still viable and will continue to be used.

With ODS, additional programming syntax provides variety and strength for displaying results.

Creating ODS Output

In SAS, procedural output may be routed to a variety of different destinations.

The current list includes the following:

- Listing Window
- HTML Documents
- Output Data Sets
- Graphic Streams
- Active X
- Java
- Rich Text Format (*.Rtf) Files
- Printer Locations
- Postscript And PCL (For High Fidelity Printers)
- SGML And Latex (Tentative)

In addition to sending output to a variety of new destinations, the appearance of the output can be modified with different fonts, colors and formatting.

To understand how SAS achieves these results and to get acquainted with the syntax of ODS, consider the following excerpt from the SAS Institute reference material:

> "All SAS procedures produce *output objects* that the Output Delivery System delivers to various *ODS destinations*, according to the default specifications for the procedure or to your own specification".

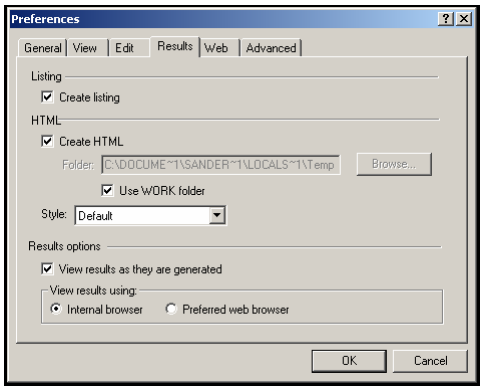
All output objects (for example, a table of parameter estimates) consist of two component parts:

- The data component, which consists of the results computed by a SAS procedure.
- The template, which contains rules for formatting and displaying the results.

The familiar part of the ODS is that output is channeled to the Listing window (the Output window).

To assure that output is written to the Listing window, select Tools ➔ Options ➔ Preferences from the pull-down menu in the Program Editor.

A Preferences window appears with a Results tab.



The Results tab permits SAS output to be sent to the Listing window, to the Results Viewer (with HTML content), to both the Listing and Results Viewer window, or to none of the above.

The Listing window is open by default.

SAS Institute has also created a series of templates with distinct colors, fonts, and HTML options enhancing the appearance of the file in the browser.

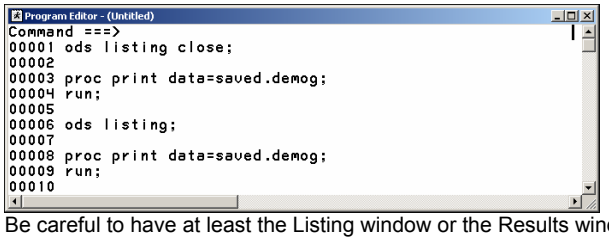
The styles include Beige, Brick, Brown, D3D, Default, Minimal, Printer, and Statdoc in Version 8.

The additional styles of BarrettsBlue, FancyPrinter, NoFontPrinter, Rtf, SansPrinter, and SerifPrinter were added in Version 8e.

ODS Listing

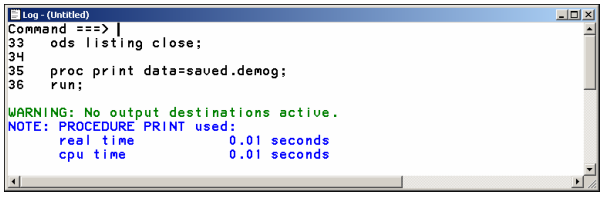
Assume that the Results tab in the Preferences window has both the Listing window and HTML output open.

For this exercise, we wish to publish only HTML output. Closing the Listing window will increase efficiency.



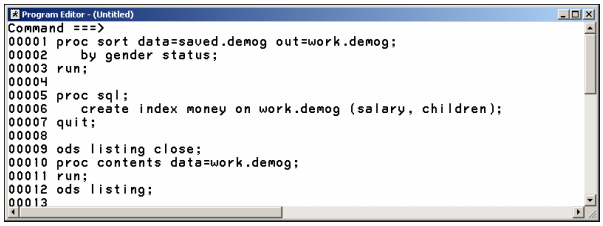
Be careful to have at least the Listing window or the Results window open.

If both windows are deactivated, the Log will display a Warning message that no output destinations are active.



Introduction to Output in ODS Terms

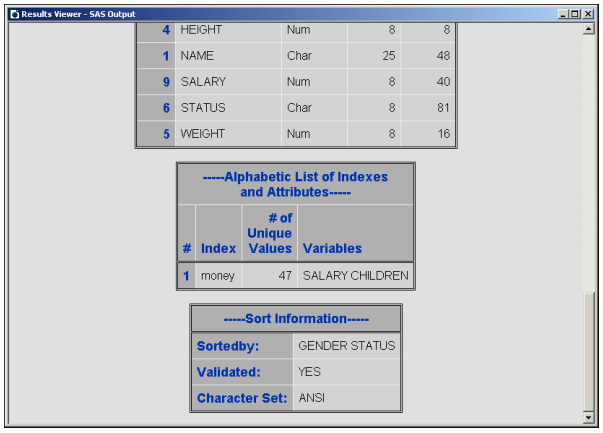
Consider the HTML output for Proc Contents.



The Results window shows that Proc Contents has multiple separate parts.

Each part of the output is a separate HTML table.

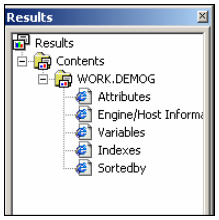
Other Proc output is actually composed of multiple tables.



Components of ODS Output

In many cases, separate HTML tables combine to create one Proc output. Why is this important?

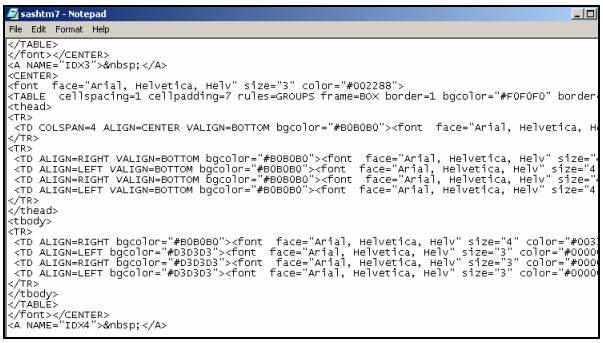
First, consider the Results window, which allows the user to navigate directly to a specific HTML table by clicking on its name.



Although each of the tables is contained in a single HTML file, navigation is made possible to any table through hyperlinks in the HTML file.

The HTML hyperlinks providing this navigation option are shown below.

By asking to inspect the source code, the hyperlinks are made visible. Hyperlinks can be identified by the syntax <A NAME="IDX3">, or where the number is any number. In the example below, IDX3 and IDX4, are both shown.



These hyperlinks are part of the document. They are created automatically when the HTML destination is open.

We can customize their syntax to take advantage of them for navigation purposes.

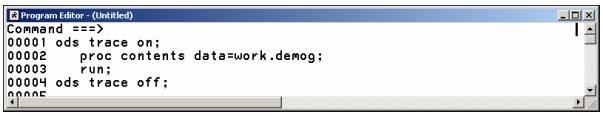
ODS Trace

There is a second reason for examining HTML output as separate tables: the programmer may wish to show only selected portions of output without showing other parts.

ODS programming allows the specification of which tables to suppress or present.

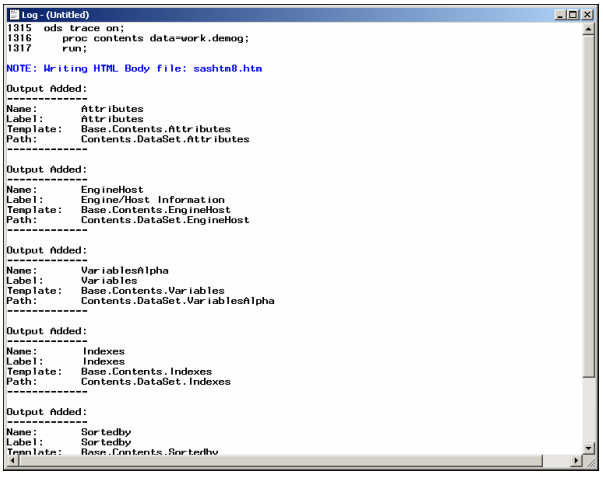
Suppressing unwanted parts of the output increases efficiency.

To find out more about the components of the Proc output, use the ODS trace statement.



This syntax requests information into the Log, which is essential for using ODS options.

The Log will now show information about each table.

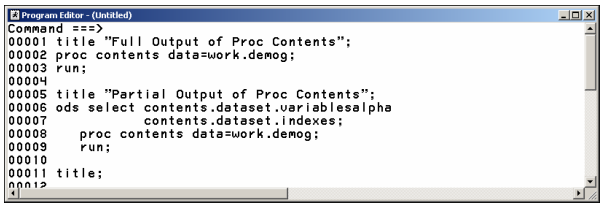


By default, the trace record contains the following information:

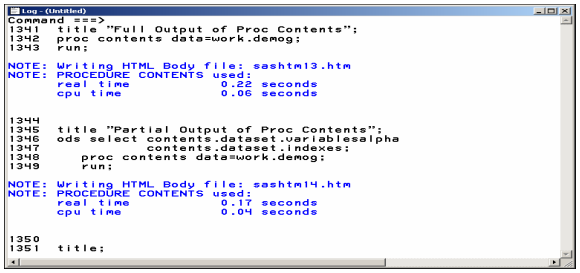
Item	Description
Name	Name of the output object
Label	Brief description of the output object
Data Name	Name of data component used to create the output; provided only when it differs from the name of the output object
Template	Template name used to create output
Path	Path of the output object

ODS Select and ODS Exclude
Suppose we were interested solely in the information about the variables and the indexes.

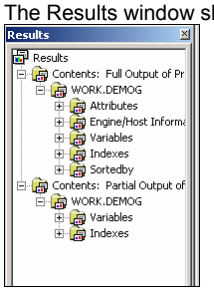
The syntax should request information be displayed on the selected tables only (or the syntax should specifically exclude the other tables).



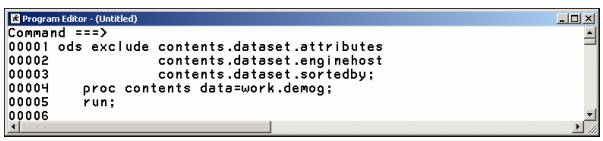
The output of the second Proc Contents is shown below. The output shows only the variables and the indexes.



The Results window shows the full output and the partial output.



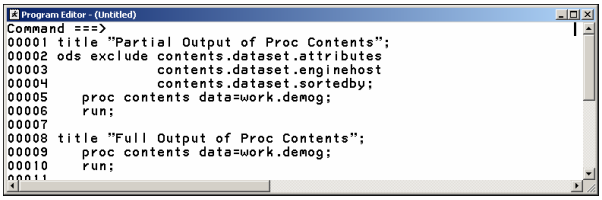
The same output is created using the Exclude action.



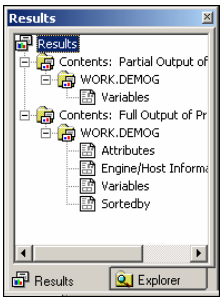
Both the Select action and the Exclude action can be used to subset the output.

Since output often consists of multiple tables, the programmer can specify which portions of a Proc will be displayed.

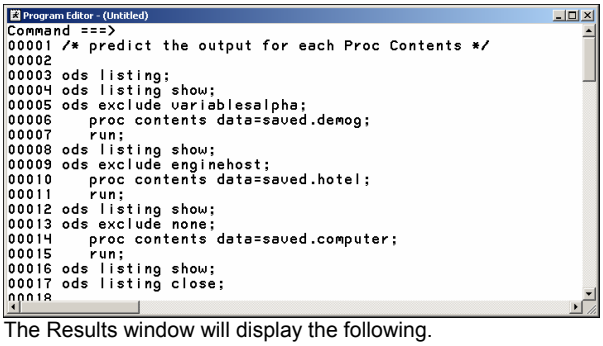
The Select action and Exclude action are in effect for the Proc, which immediately follows them.



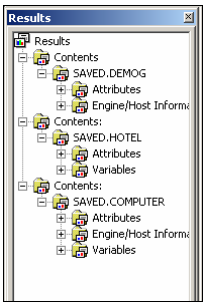
The Results window shows the differences in output.

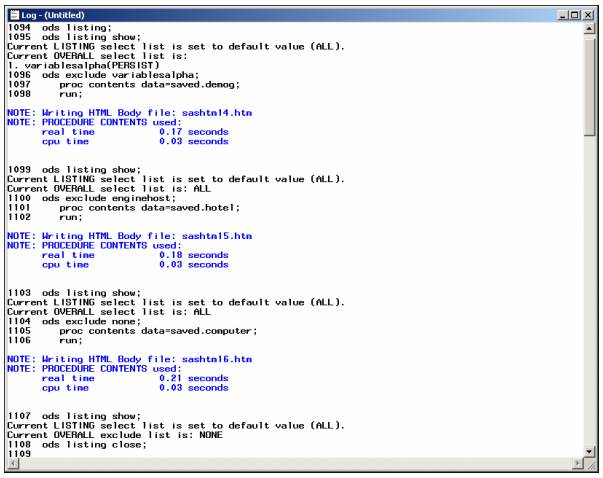


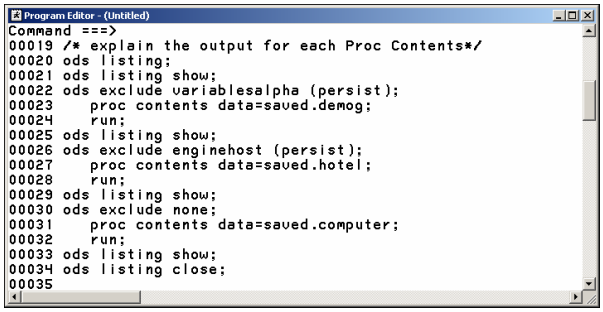
In order to extend the functionality of the Select action or the Exclude action to the next procedural output, use the Persist syntax.

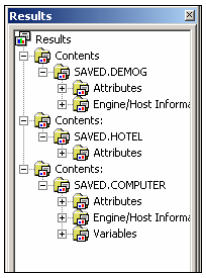


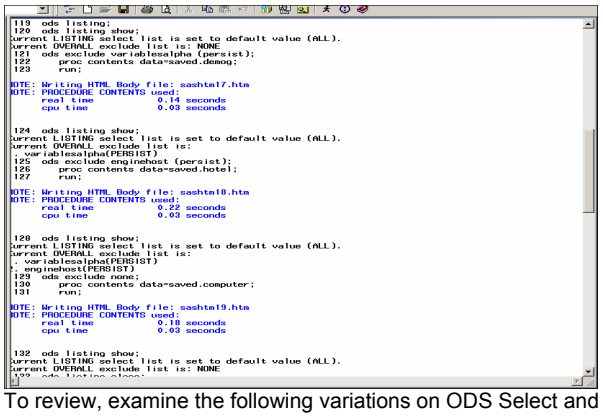
The Results window will display the following.











To review, examine the following variations on ODS Select and ODS Exclude syntax.

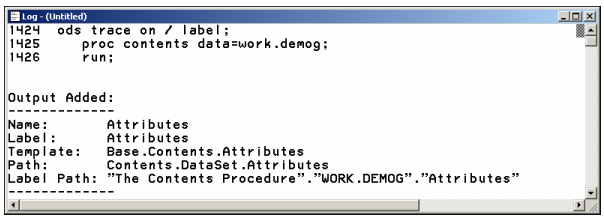
```
Ods select <table_template_name>;
Ods select all;
Ods select;
Ods select <table_template_name>
(persist);

Ods exclude <table_template_name>;
Ods exclude none;
Ods exclude;
Ods exclude <table_template_name>
(persist);
```

The default values depend on the ODS destination:

- **ODS LISTING:** select all
- **ODS HTML:** select all
- **ODS OUTPUT:** exclude all
- **Overall:** select all

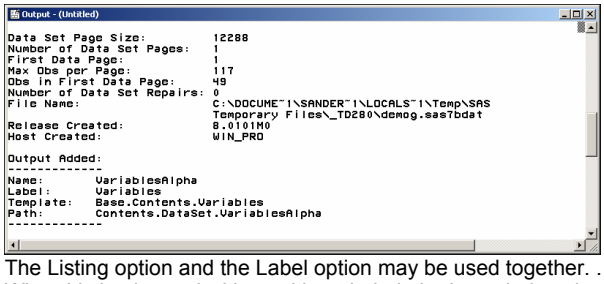
Using Labels and Listing Options on ODS Trace Statements

The ODS trace statement uses the Label and Listing options, as displayed.



The Label option displays additional information in the Log window.

The Listing option includes the trace details in the Listing window along with the Proc contents output.



The Listing option and the Label option may be used together. . When Listing is used with or without Label, the Log window does not contain the trace details.

Alternative Table References

The ODS trace statement showed the following features of each output table:

- Name
- Label
- Template
- Path
- Label Path

The syntax shown earlier, for the Select action and the Exclude action, referenced the full path.

We can use syntax for the Select action and Exclude action to reference any of the following parts of a table's features:

- Full path
- Partially qualified path
- Label (surrounded by quotation marks)
- Label path
- Partial label path
- Mixture of labels and paths
- Any above specification with # plus number

A partially qualified path is truncated by removing sections from the left side up to each dot.

For example, here is a full path:

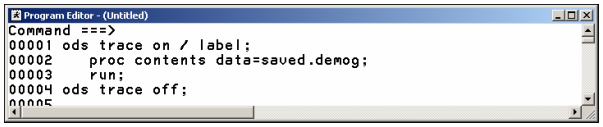
contents.datasets.indexes

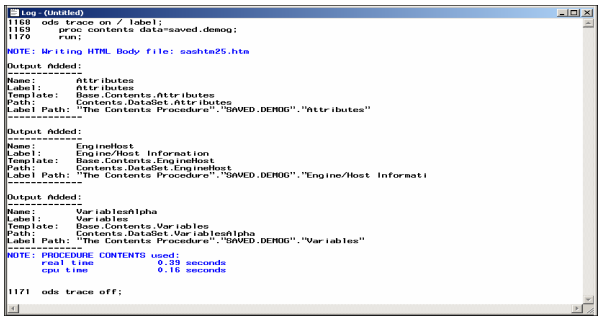
The above path may be referenced by the partial path designations displayed below:

datasets.indexes
indexes

Partially qualified label paths observe the same truncation rule of removing sections from the left side up to each dot.

The following syntax displays different ways of referencing output. The same output table has been referenced in different ways.





EngineHost	Name
“Engine/Host Information”	Label
Contents.DataSet.EngineHost	Path
DataSet.EngineHost	Partial Path
EngineHost	Partial Path
“The Contents Procedure”. ”Saved.Demog”.”Engine/Host Information”	Label Path
”Saved.Demog”.”Engine/Host Information”	Partial Label Path
”Engine/Host Information”	Partial Label Path

A combination of labels and paths can be used.

Any path specification followed by a # and a number will reference that name and the numbered output.

The references above are not case sensitive.

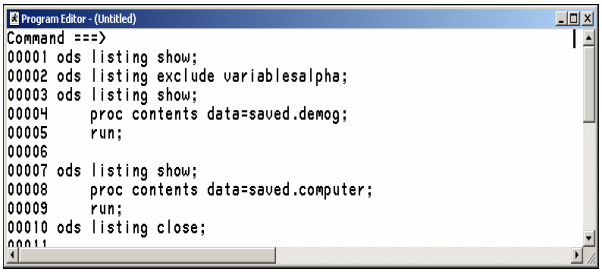
Of the information in the Trace output, only the Template information is not used in the Select and Exclude syntax.

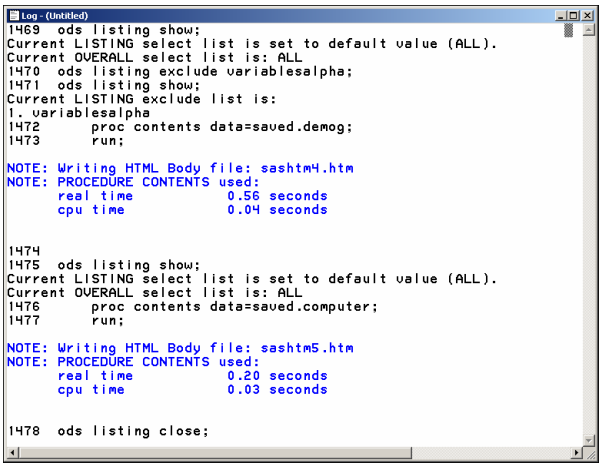
ODS Listing Syntax

Although the Listing window is open by default, it can be opened, managed, and closed as needed.

- ODS LISTING
- ODS LISTING EXCLUDE
- ODS LISTING SELECT
- ODS LISTING SHOW
- ODS LISTING CLOSE

The ODS Listing statement with ‘show’ can be helpful in determining subset information.

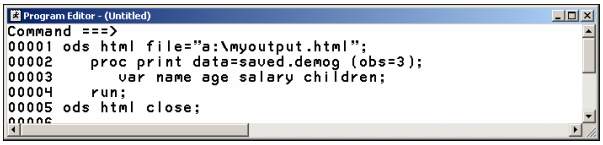




Note: The reference to variablesalpha in Proc contents is correct for version 8. Beginning with version 9, the preferred term is variables.

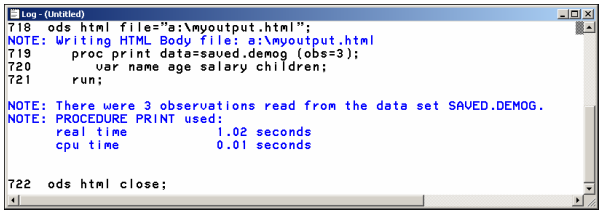
Enhancing ODS HTML Output

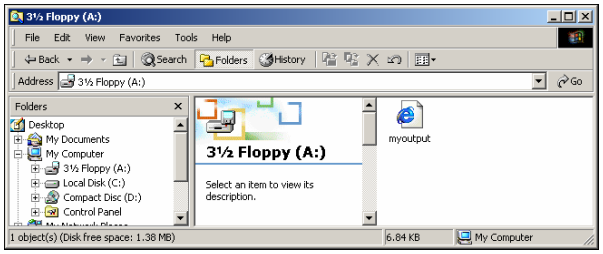
We can enhance ODS HTML output using the ODS HTML File =option.

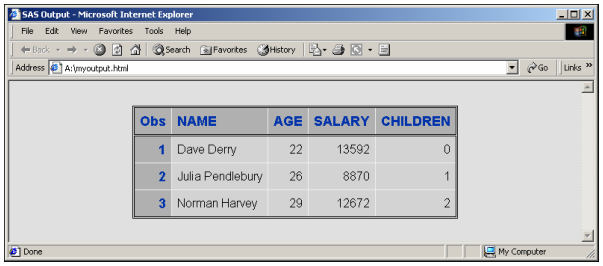


Aspects of this syntax include the following:

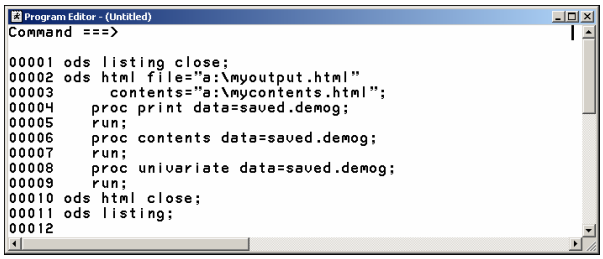
- The file extension must be either ‘html’ or ‘htm’
- The file= syntax can also use body=
- Multiple procedures can be included

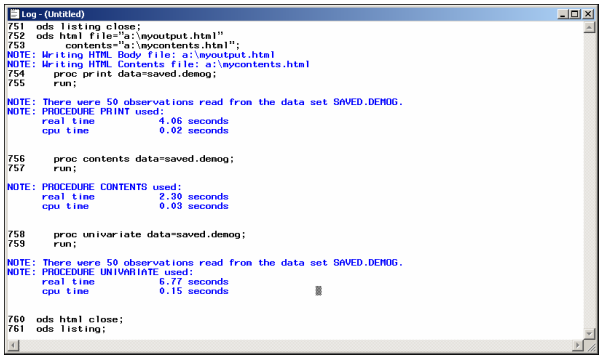


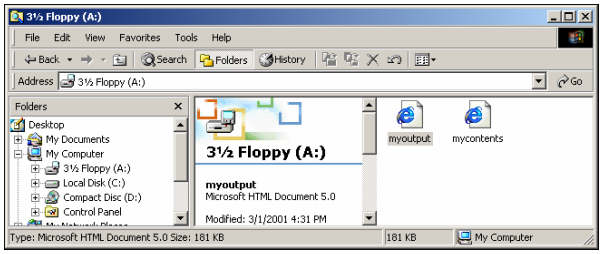


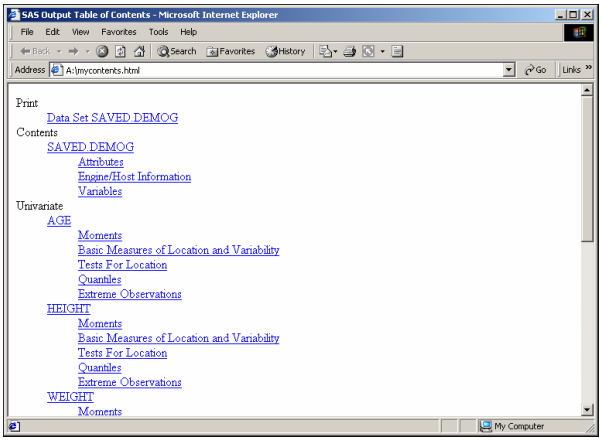


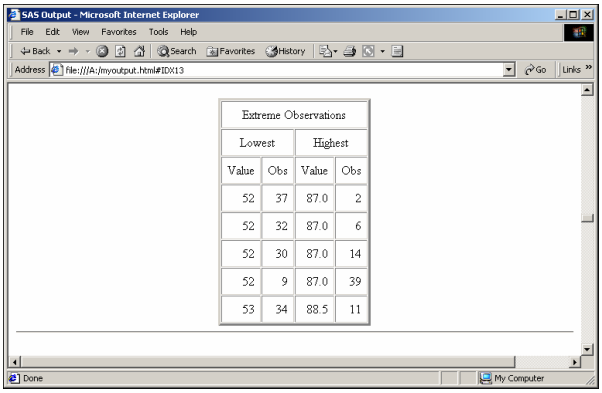
Enhancing ODS HTML Output / File=, Contents=



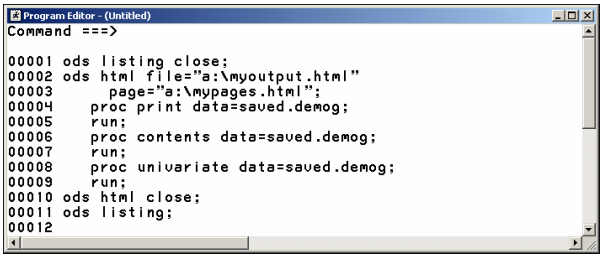


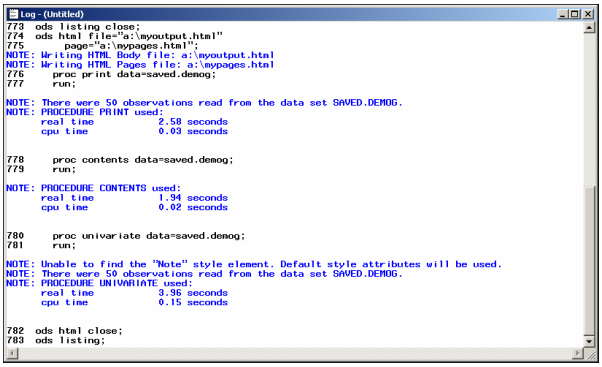


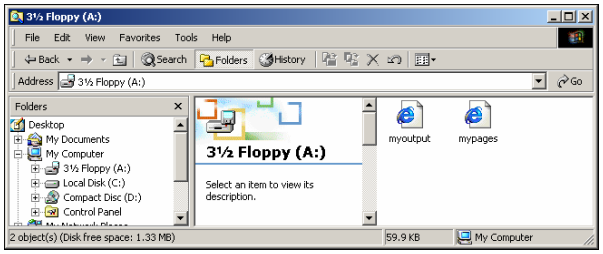


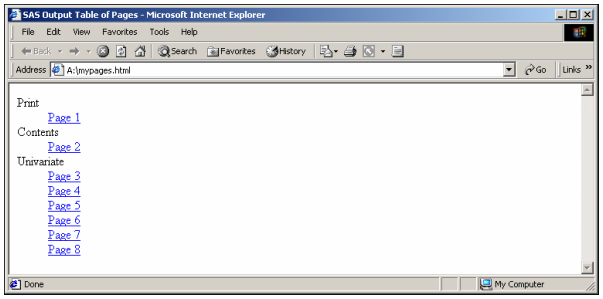


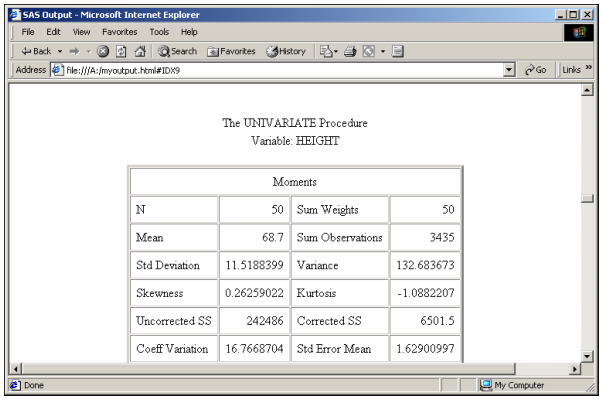
Enhancing ODS HTML Output / File=, Page=



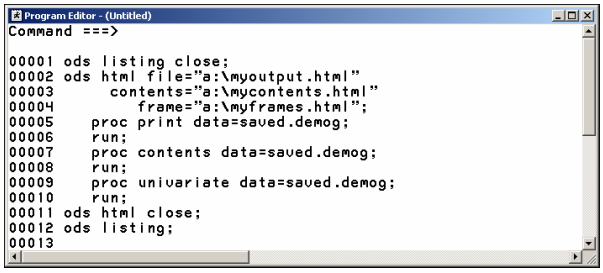


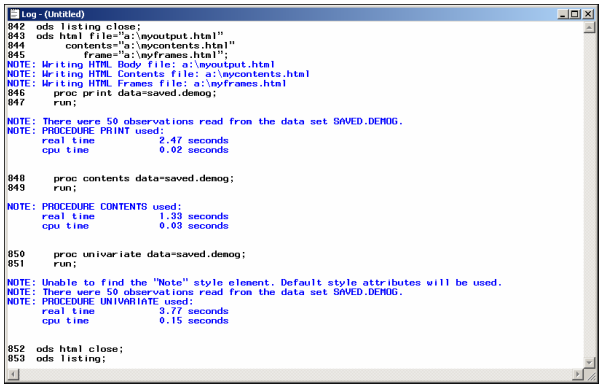


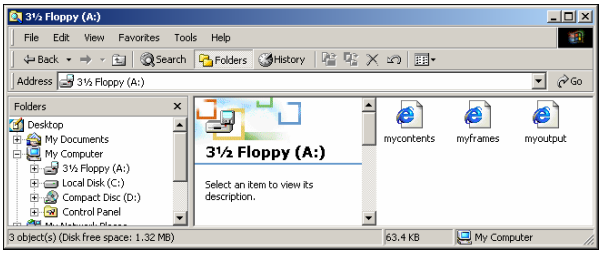


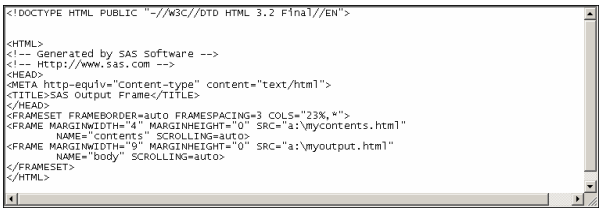


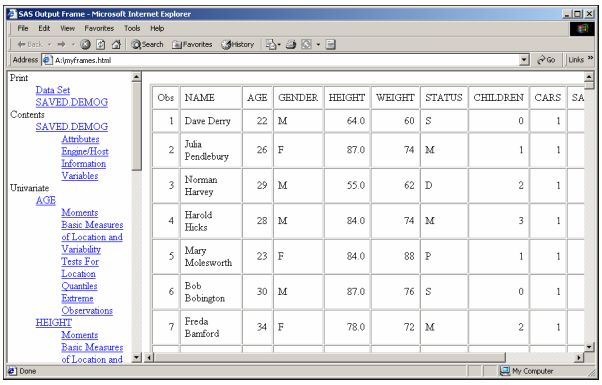
Enhancing ODS HTML Output / File=, Contents=, Frame=



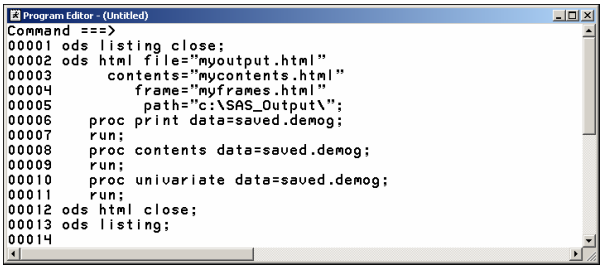


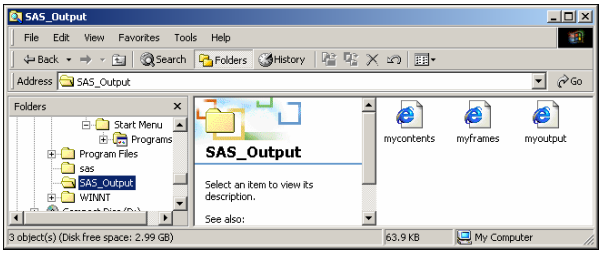






Enhancing ODS HTML Output / File=, Contents=, Frame=, Path=



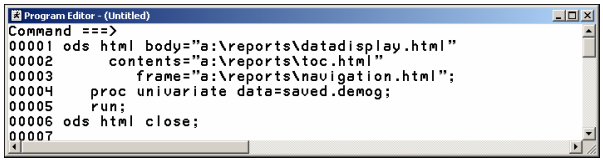


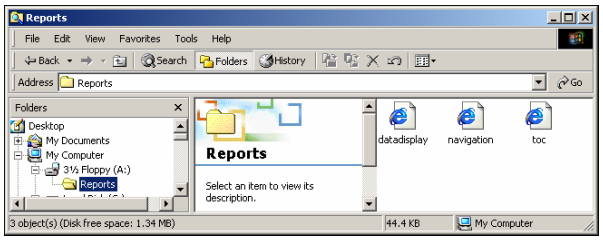
Creating Hyperlinks – Path, Base and URL Syntax

The hyperlink paths created in the Frames file are important.

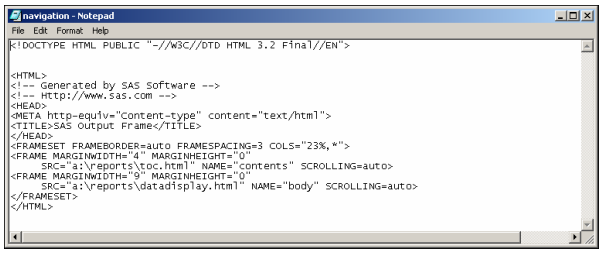
Correct use of the URL=, Path= and Base= options assure desired results.

The first syntax to consider is omitting the URL reference entirely.



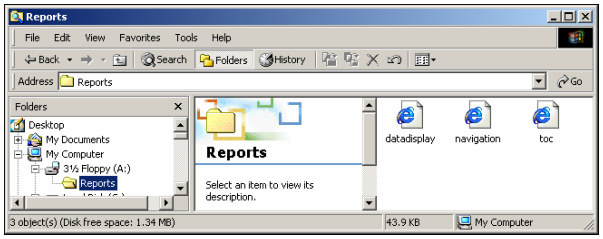


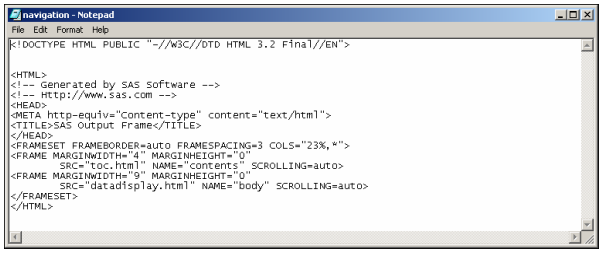
Notice the SRC= syntax which provides path information referencing the drive and subfolders containing the file.



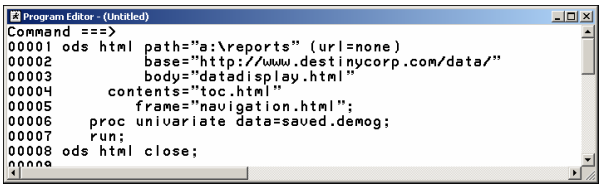
Consider using the PATH= and URL=NONE explicitly stated in the syntax.

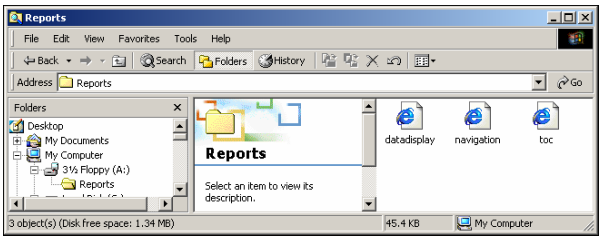
In this syntax, the hyperlinks lack information on the drive and folder. Only the file is referenced. It implies that the file must be in the same disk location as the frames file.

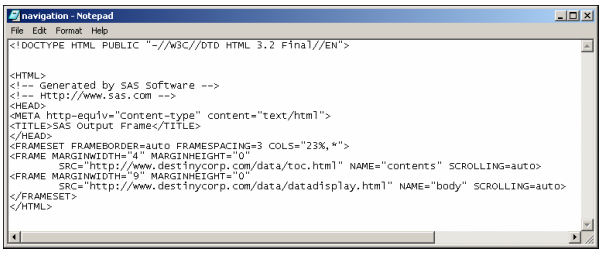




File location can be seen when supplying the Path=, URL=NONE, and Base= information.



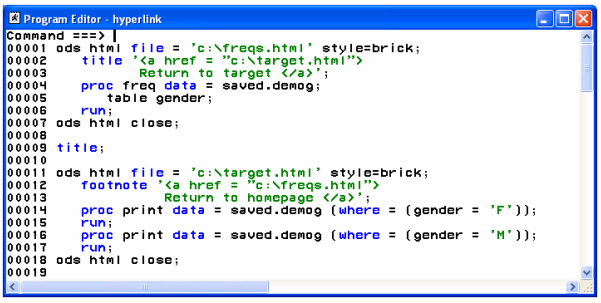




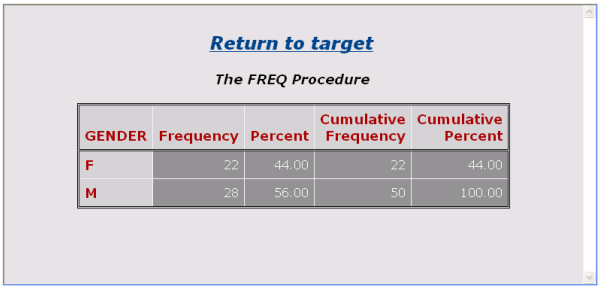
Titles and Footnotes in HTML Output/Report Styles

Titles and footnotes have always been available for procedural output. With ODS HTML output, titles and footnotes can take on the new role of hyperlinks.

Examine the following output. It might be helpful to have navigation at the top and/or bottom of the browser page.



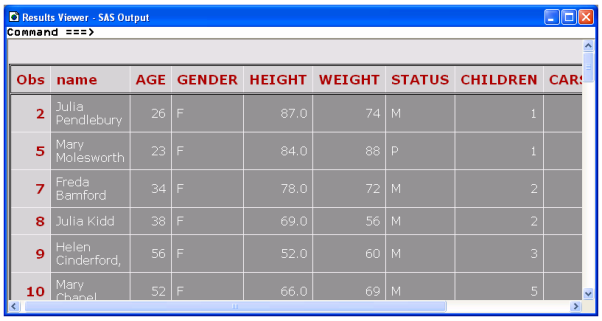
Note the title statement in the first ods section includes an href to the second ods section. Likewise the second ods has an href in the footnote statement to the first ods. By clicking on either underlined reference, the viewer presents the other html page.



Return to target

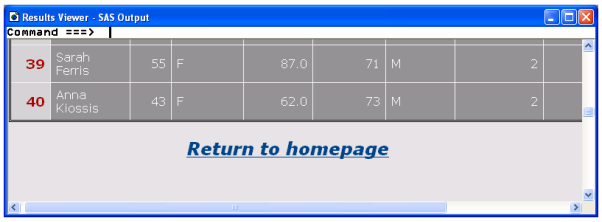
The FREQ Procedure

GENDER	Frequency	Percent	Cumulative Frequency	Cumulative Percent
F	22	44.00	22	44.00
M	28	56.00	50	100.00



Obs	name	AGE	GENDER	HEIGHT	WEIGHT	STATUS	CHILDREN	CAR
2	Julia Pendlebury	26	F	87.0	74	M	1	
5	Mary Molesworth	23	F	84.0	88	P	1	
7	Freda Bamford	34	F	78.0	72	M	2	
8	Julia Kidd	38	F	69.0	56	M	2	
9	Helen Cinderford,	56	F	52.0	60	M	3	
10	Mary Chabel	52	F	66.0	69	M	5	

By scrolling to the bottom of the female (or male) gender observations, an href allows a return to the other page with a click.



39	Sarah Ferris	55	F	87.0	71	M	2	
40	Anna Klossis	43	F	62.0	73	M	2	

Return to homepage

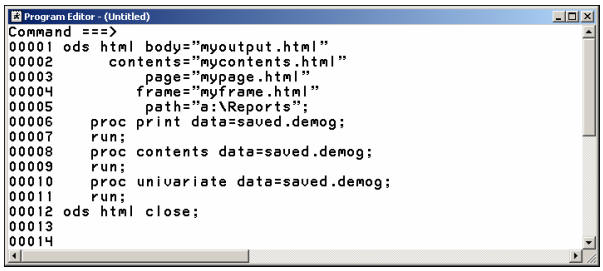
ODS HTML <...> NEWFILE =

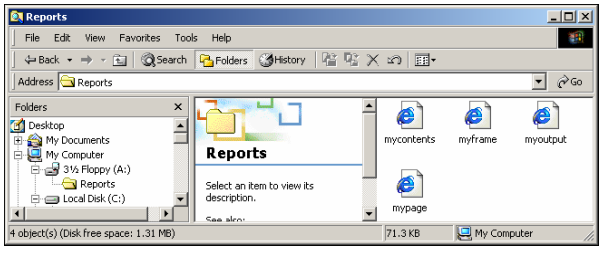
By default, all output is put into a single Body file.

This can be expressed in syntax with the NEWFILE=NONE option.

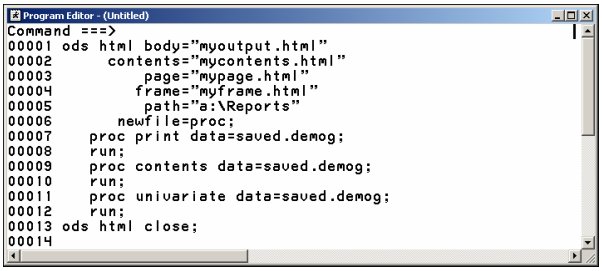
In contrast, multiple documents can be created, each holding separate procedural output. If the Body file ends in a number, procedural output is put into separate files, each numbered from the original starting point.

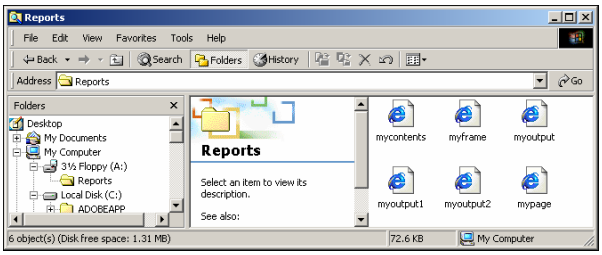
A new file of output can also be created with each page of output (NEWFILE=PAGE) or each Proc output (NEWFILE=PROC). A separate file can also be created for each piece of output (NEWFILE=OUTPUT).

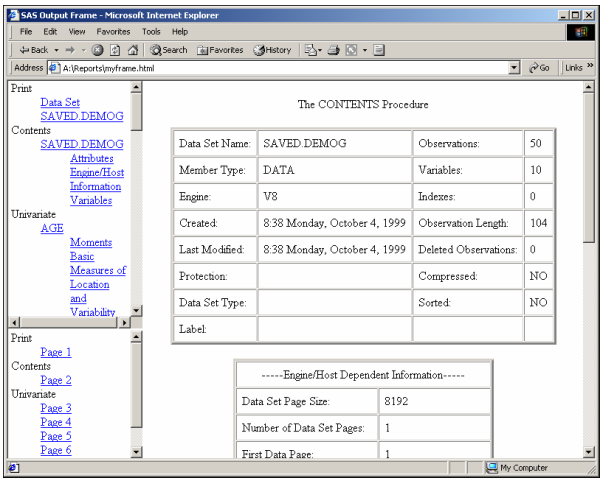




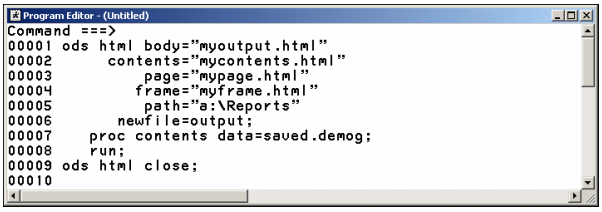
Create separate files for each procedural output.

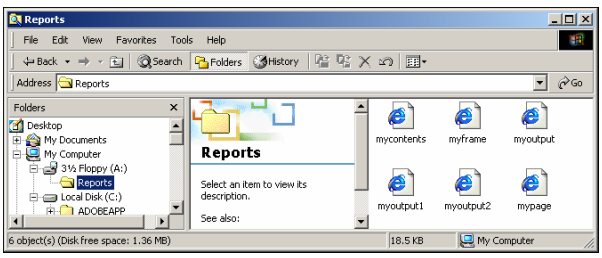


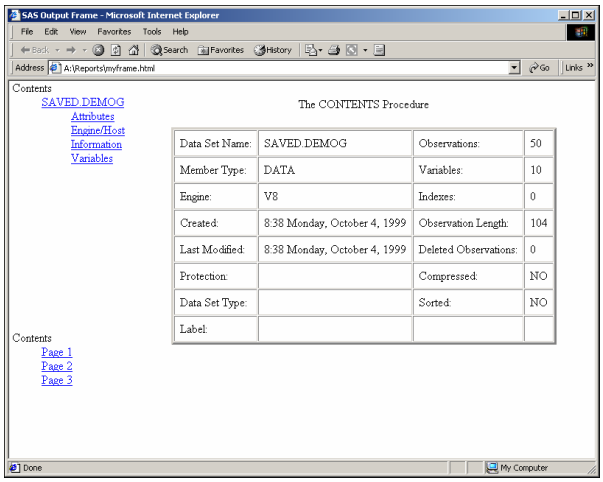




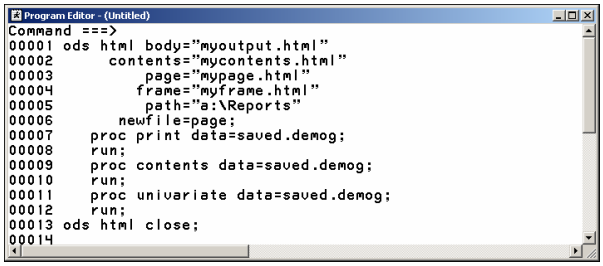
Create separate files for each table template of the document.

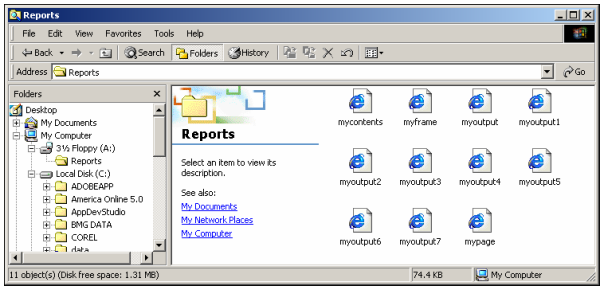


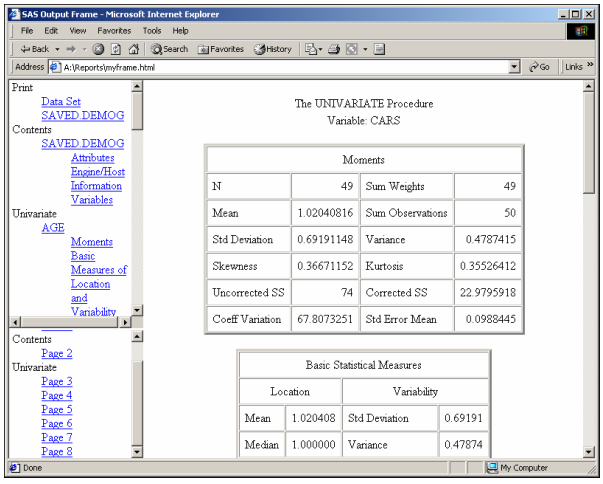




Create a new file for each page output of the procedure.

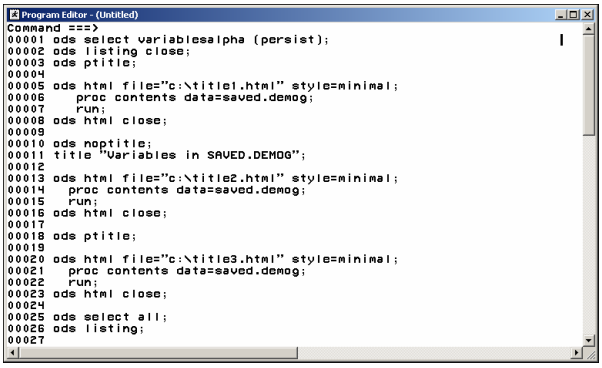


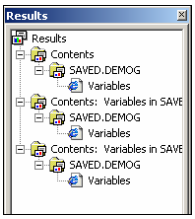


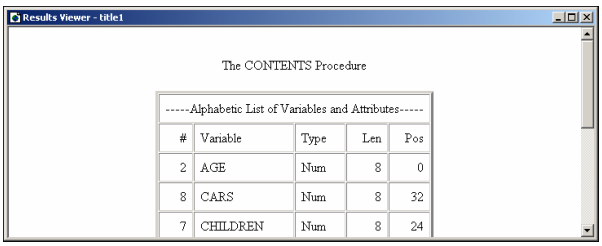


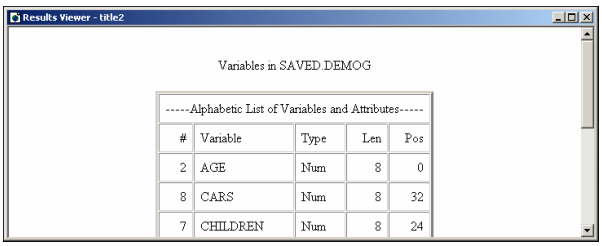
ODS NOPTITLE

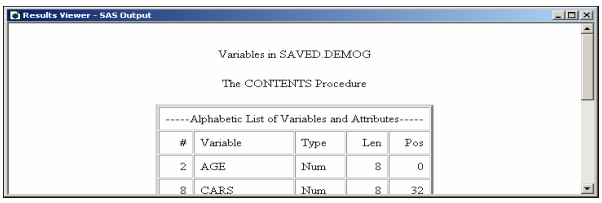
To remove the title of the Procedure, use ODS Noptitle.











ODS HTML with Graphs – Introduction

SAS can create graphic output (with the SAS/GRAPH license) directly to the Web.

This process uses Web drivers:

- GIF
- ACTIVE X
- JAVA
- WEBFRAME
- GIFANIM
- JAVAMET (v. 8.1)

The SAS/GRAPH procedures that may be used with Gif, Active X and Java include:

- GANNO (Gif)

- GCHART (Gif, Active X, Java)
- GCONTOUR (Gif, Active X, Java)
- GFONT (Gif)
- GIMPORT (Gif)
- GMAP (Gif, Active X, Java)
- GPLOT (Gif, Active X, Java)
- GPRINT (Gif)
- GREPLAY (Gif)
- GTESTIT (Gif)
- GSLIDE (Gif)
- G3D (Gif, Active X, Java)
- G3GRID (Gif)

Not all graph options can be applied to each output destination. Check your documentation for specifics and version updates.

Active X

Version 8 onwards, SAS/GRAPH can create Active X graphs for viewing in Web browser mode.

Once the graph is created, it can be customized without having to re-run it.

For example, a vertical bar chart can be changed into a horizontal bar chart or a pie chart. Features such as type, color and axes can be modified.

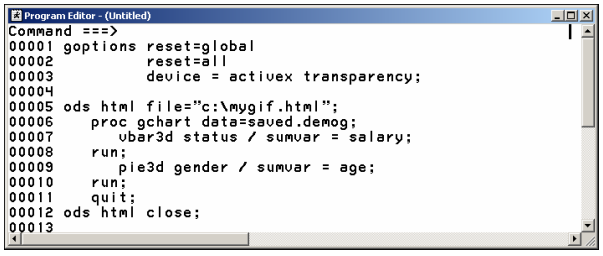
Features of SAS/GRAPH procedures that are not supported include:

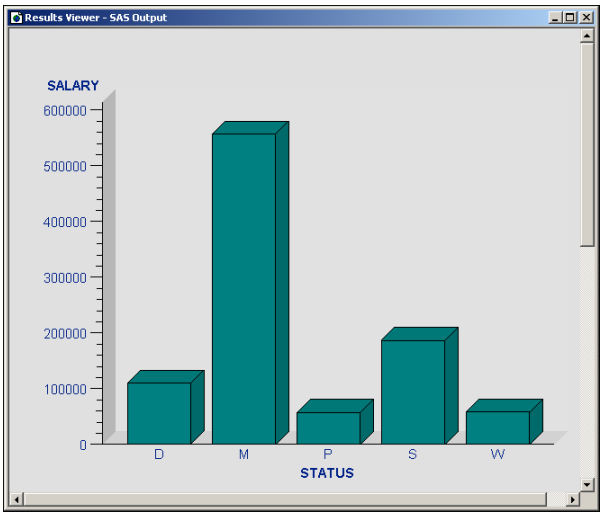
- User-defined formats
- Fonts (other than certain PC TrueType fonts)

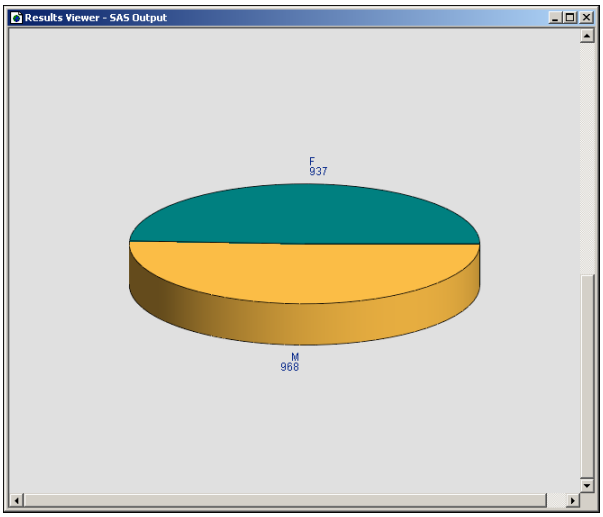
Active X does not support the following procedures:

- GTESTIT
- GSLIDE
- GREPLAY
- GANNO
- GPRINT

It will produce Active X output.







Java

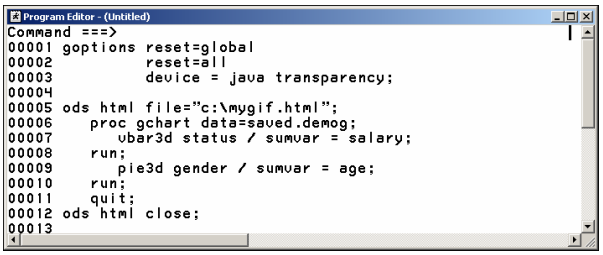
SAS/GRAPH can also create Java output.

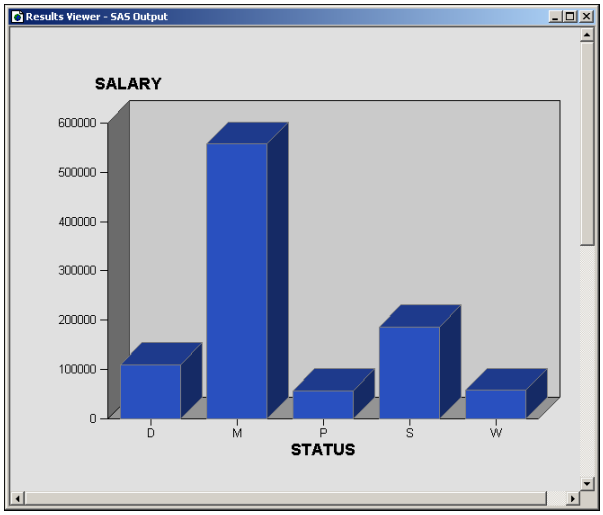
There are some limitations.

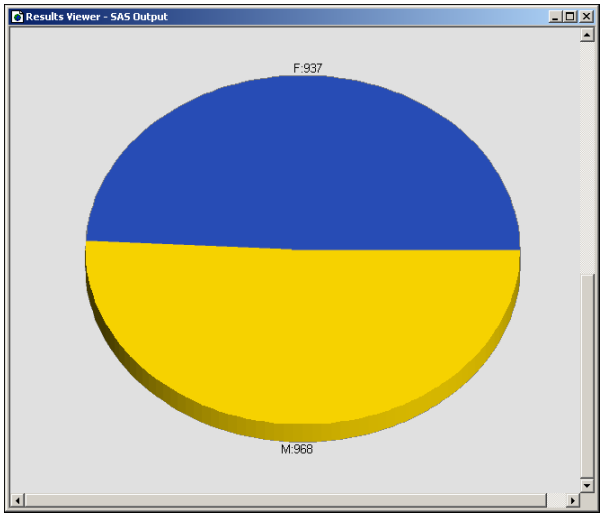
The following graph procedures do not produce Java output:

- PROC GANNO
- PROC GPRINT
- PROC GREPLAY
- PROC GSLIDE
- PROC GTESTIT

Since Version 8.1, Java output can support user-defined formats. Specific syntax is required to accommodate user-defined formats.




Results Viewer - SAS Output
SALARY
600000
500000
400000
300000
200000
100000
0
D
M
P
S
W
STATUS


Results Viewer - SAS Output
F:937
M:968