

# THE OUTPUT DELIVERY SYSTEM TUTORIAL

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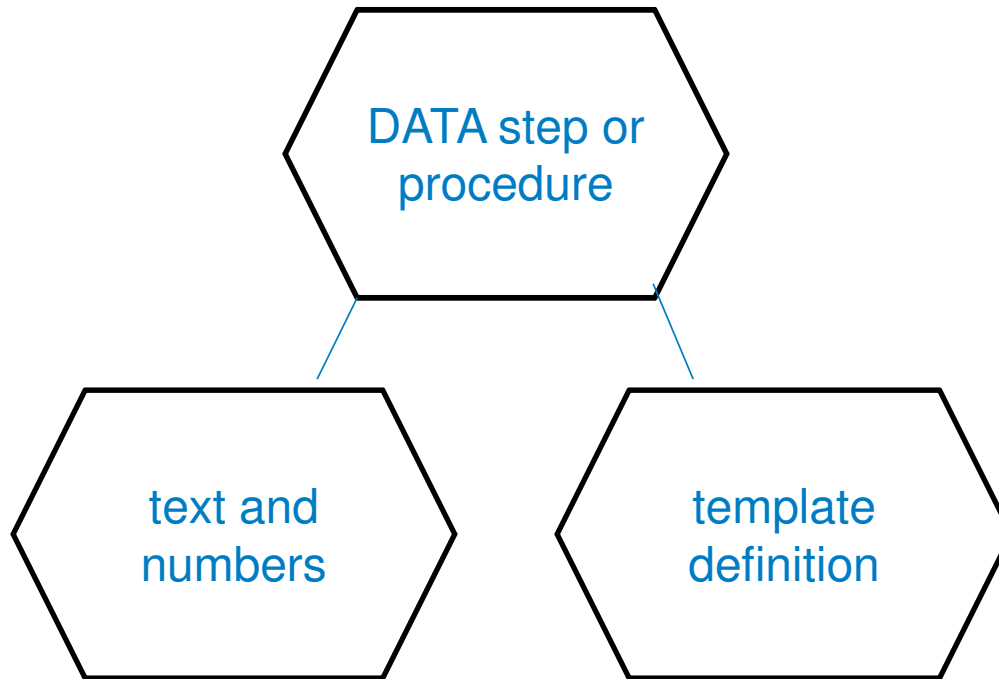
# Overview

- Output Delivery System Basics
- Controlling SAS Output using ODS
- Formatting your ODS Output
- Introduction to ODS Graphics
- Creating Formatted Email
- New features and ODS destinations of SAS 9.4

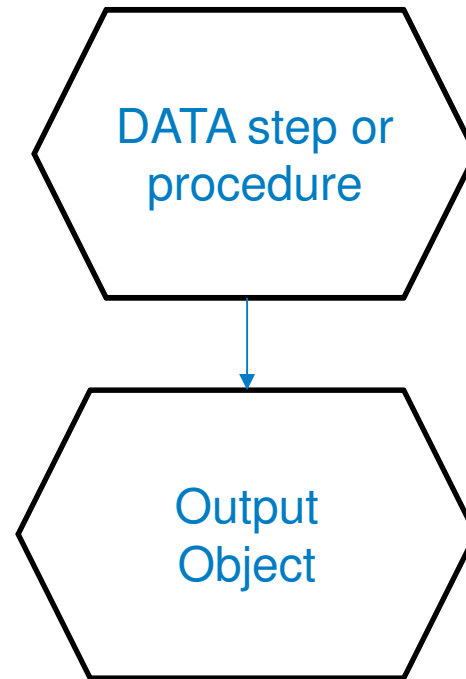
# Output Delivery System Basics

- Generating and identifying output objects
- Selecting and excluding output objects
- Generating output data sets based on objects

# Generating Output Objects



# Generating Output Objects



# Identifying Output Objects Created

```
ods trace on;  
  
proc reg data=sashelp.class;  
model height=weight;  
quit;
```

# Identifying Output Objects Created

The screenshot shows two windows from the SAS interface. The left window, titled 'Log - (Untitled)', displays the following SAS code and output object details:

```

181 ods trace on;
182
183 proc reg data=sashelp.class;
184 model height=weight;
185 quit;
    
```

Output Added:

Name: NObs  
Label: Number of Observations  
Template: Stat.REG.NObs  
Path: Reg.MODEL1.Fit.Height.NObs

Output Added:

Name: ANOVA  
Label: Analysis of Variance  
Template: Stat.REG.ANOVA  
Path: Reg.MODEL1.Fit.Height.ANOVA

Output Added:

Name: FitStatistics  
Label: Fit Statistics  
Template: Stat.REG.FitStatistics  
Path: Reg.MODEL1.Fit.Height.FitStatistics

Output Added:

Name: ParameterEstimates  
Label: Parameter Estimates  
Template: Stat.REG.ParameterEstimates  
Path: Reg.MODEL1.Fit.Height.ParameterEstimates

Output Added:

Name: DiagnosticsPanel  
Label: Fit Diagnostics  
Template: Stat.REG.Graphics.DiagnosticsPanel  
Path: Reg.MODEL1.ObswiseStats.Height.DiagnosticPlots.DiagnosticsPanel

The right window, titled 'Results Viewer - SAS Output', displays the following statistical results for the REG procedure:

The REG Procedure  
Model: MODEL1  
Dependent Variable: Height

Number of Observations Read	19
Number of Observations Used	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	364.57626	364.57626	57.08	<.0001
Error	17	108.58795	6.38753		
Corrected Total	18	473.16421			

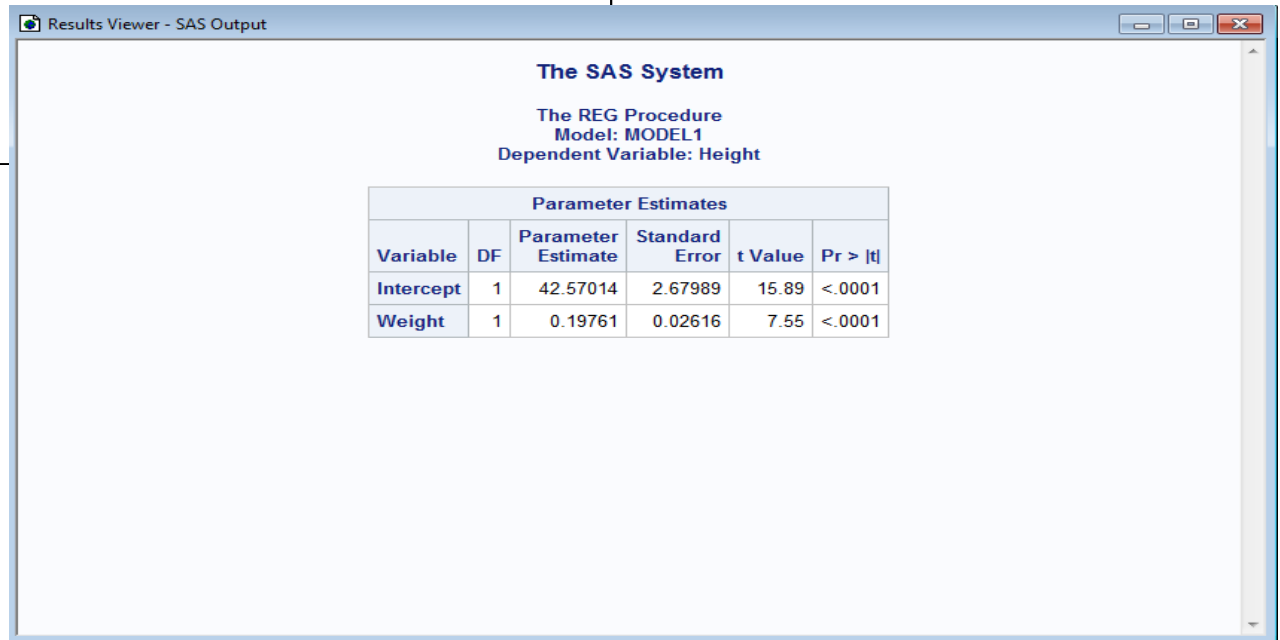
Root MSE 2.52736 R-Square 0.7705  
Dependent Mean 62.33684 Adj R-Sq 0.7570  
Coeff Var 4.05435

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	62.33684	2.52736	24.66	<.0001
Weight	1	0.50814	0.01250	40.64	<.0001

# Selecting and Excluding Objects

```
ods select parameterEstimates;  
  
proc reg data=sashelp.class;  
model height=weight;  
quit;
```



The SAS System  
The REG Procedure  
Model: MODEL1  
Dependent Variable: Height

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	1	42.57014	2.67989	15.89	<.0001
Weight	1	0.19761	0.02616	7.55	<.0001



# Selecting and Excluding Objects

```
ods exclude parameterEstimates;  
  
proc reg data=sashelp.class;  
model height=weight;  
quit;
```

The SAS System

The REG Procedure  
Model: MODEL1  
Dependent Variable: Height

Number of Observations Read	19
Number of Observations Used	19

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	364.57626	364.57626	57.08	<.0001
Error	17	108.58795	6.38753		
Corrected Total	18	473.16421			

Root MSE	2.52736	R-Square	0.7705
Dependent Mean	62.33684	Adj R-Sq	0.7570
Coeff Var	4.05435		

The SAS System

# Selecting and Excluding Objects-Persisting Objects

```
ods select ParameterEstimates(persist);
```

```
proc reg data=sashelp.class;  
model height=weight;  
quit;
```

```
proc reg data=sashelp.class;  
model height=weight;  
quit;
```

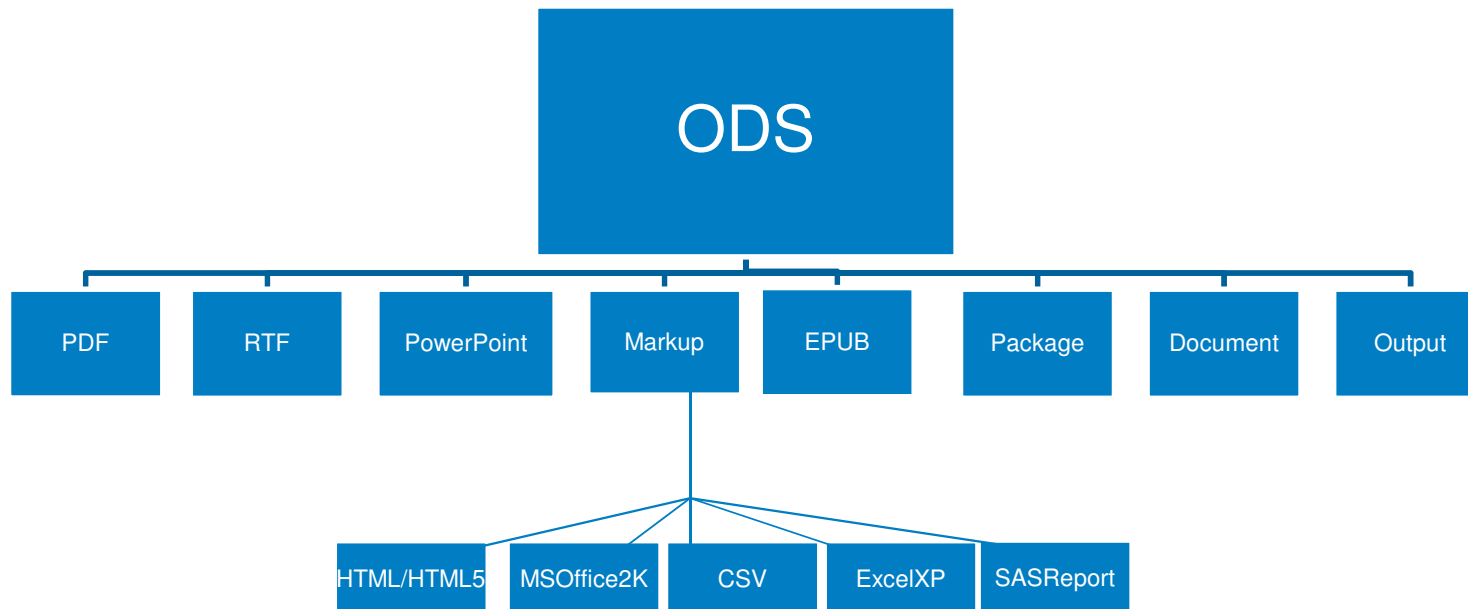
# Creating Output Data Sets from Objects

```
ods output parameterEstimates=PE;  
  
proc reg data=sashelp.class;  
model height=weight;  
quit;
```

# Controlling SAS Output Using ODS

- Preview of the current ODS destinations
- Enhancing output of specific ODS destinations
- Formatting ODS output

# Previewing the Current ODS Destinations



# Controlling SAS Output Using ODS HTML

```
Ods html path= 'c:\Wtemp' (url=none)  
          file= 'output.html'  
          contents= 'toc.html'  
          frame= 'frame.html' ;
```

```
proc print data=sashelp.orsales;  
run;
```

```
proc print data=sashelp.prdsale;  
run;
```

```
Ods html close;
```

# Controlling SAS Output Using ODS HTML

Table Of Contents

Body file

Table of Contents

1. The Print Procedure  
[Data Set](#)  
[SASHELP.ORSALES](#)
2. The Print Procedure  
[Data Set](#)  
[SASHELP.PROSALE](#)

Obs	Year	Quarter	Product_Line	Product_Category	Product_Group	Quantity	Profit	Total_Retail_Price
1	1999	1999Q1	Children	Children Sports	A-Team, Kids	286	4980.15	8990.90
2	1999	1999Q1	Children	Children Sports	Bathing Suits, Kids	98	1479.95	2580.40
3	1999	1999Q1	Children	Children Sports	Eclipse, Kid's Clothes	588	9348.95	18768.80
4	1999	1999Q1	Children	Children Sports	Eclipse, Kid's Shoes	334	7136.80	14337.20
5	1999	1999Q1	Children	Children Sports	Lucky Guy, Kids	303	7163.00	12996.20
6	1999	1999Q1	Children	Children Sports	N.D. Gear, Kids	755	19153.05	34250.50
7	1999	1999Q1	Children	Children Sports	Olssons, Kids	209	1975.35	3339.30
8	1999	1999Q1	Children	Children Sports	Orion Kid's Clothes	14	288.80	580.40
9	1999	1999Q1	Children	Children Sports	Osprey, Kids	454	7334.70	13219.60
10	1999	1999Q1	Children	Children Sports	Tracker Kid's Clothes	1243	21847.85	40049.50

# Controlling SAS Output Using ODS HTML

```
Ods html path= 'c:\temp' (url=none)
         file= 'output.html'
         contents= 'toc.html'
         frame= 'frame.html' ;
```

```
Ods proclabel 'Expense Detail ';
```

```
proc print data=sashelp.orsales
  contents= 'Expense ' ;
run;
```

```
Ods proclabel 'Profit Detail ';
```

```
proc print data=sashelp.prdsale
  contents= 'Profit ' ;
run;
```

```
Ods html close;
```



# Controlling SAS Output Using ODS HTML- Table of Contents

The screenshot shows a web browser window titled "SAS Output Frame" displaying an HTML report. The report has a "Table of Contents" on the left and a data table on the right. The table is titled "Budget Across Countries" and contains 10 rows of data. Two blue arrows point from the "Table of Contents" to the corresponding rows in the table.

**Table of Contents**

- 1. Expense Detail  
    [Expense](#)
- 2. Profit Detail  
    [Profit](#)

**Budget Across Countries**

Obs	ACTUAL	PREDICT	COUNTRY	REGION	DIVISION	PRODTYPE	PRODUCT	QUARTER	YEAR	MONTH
1	\$925.00	\$850.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Jan
2	\$999.00	\$297.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Feb
3	\$808.00	\$846.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Mar
4	\$642.00	\$533.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Apr
5	\$656.00	\$646.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	May
6	\$948.00	\$486.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Jun
7	\$612.00	\$717.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Jul
8	\$114.00	\$564.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Aug
9	\$685.00	\$230.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Sep
10	\$657.00	\$494.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Oct

# Controlling SAS Output Using ODS HTML-Drill-Downs

```
ods html file="c:\temp\temp.html";

proc report data=sashelp.prdsale nowd spanrows;
column country division actual predict;
define country / group style(column)={vjust=middle};
define division / group;
define actual / sum;

Compute country;
  urlink="c:\temp\||trim(left(country))||.html" ;
  Call define(_col_,'URL',urlink);
endcomp;

run;
ods _all_ close;
```

# Controlling SAS Output Using ODS HTML-Drill-Downs

## Budget Across Countries

Country	Division	Actual Sales	Predicted Sales
<a href="#">CANADA</a>	CONSUMER	\$117,984.00	\$118,319.00
	EDUCATION	\$129,006.00	\$114,700.00
<a href="#">GERMANY</a>	CONSUMER	\$123,846.00	\$116,443.00
	EDUCATION		
<a href="#">U.S.A.</a>	CONSUMER		
	EDUCATION		

The screenshot shows a web browser window with the address bar displaying 'C:\temp\GERMANY.html' and the page title 'SAS Output'. The main content is a detailed table titled 'Budget Across Countries' with the following data:

Actual Sales	Predicted Sales	Country	Region	Division	Product type	Product	Quarter	Year	Month
\$996.00	\$977.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Jan
\$554.00	\$549.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Feb
\$540.00	\$951.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Mar
\$140.00	\$390.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Apr
\$554.00	\$204.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	2	1993	May
\$724.00	\$78.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Jun
\$693.00	\$613.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Jul
\$866.00	\$745.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Aug
\$833.00	\$56.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Sep
\$164.00	\$887.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Oct
\$753.00	\$651.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Nov
\$60.00	\$691.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Dec
\$688.00	\$767.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Jan
\$883.00	\$709.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Feb
\$109.00	\$417.00	GERMANY	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Mar

# Controlling SAS Output Using ODS PDF

- Controlling pagination using STARTPAGE=
- Paneling tables and graphics using the COLUMNS=
- Modifying the default expansion level of the bookmarklist

# Controlling SAS Output Using ODS PDF- STARTPAGE=

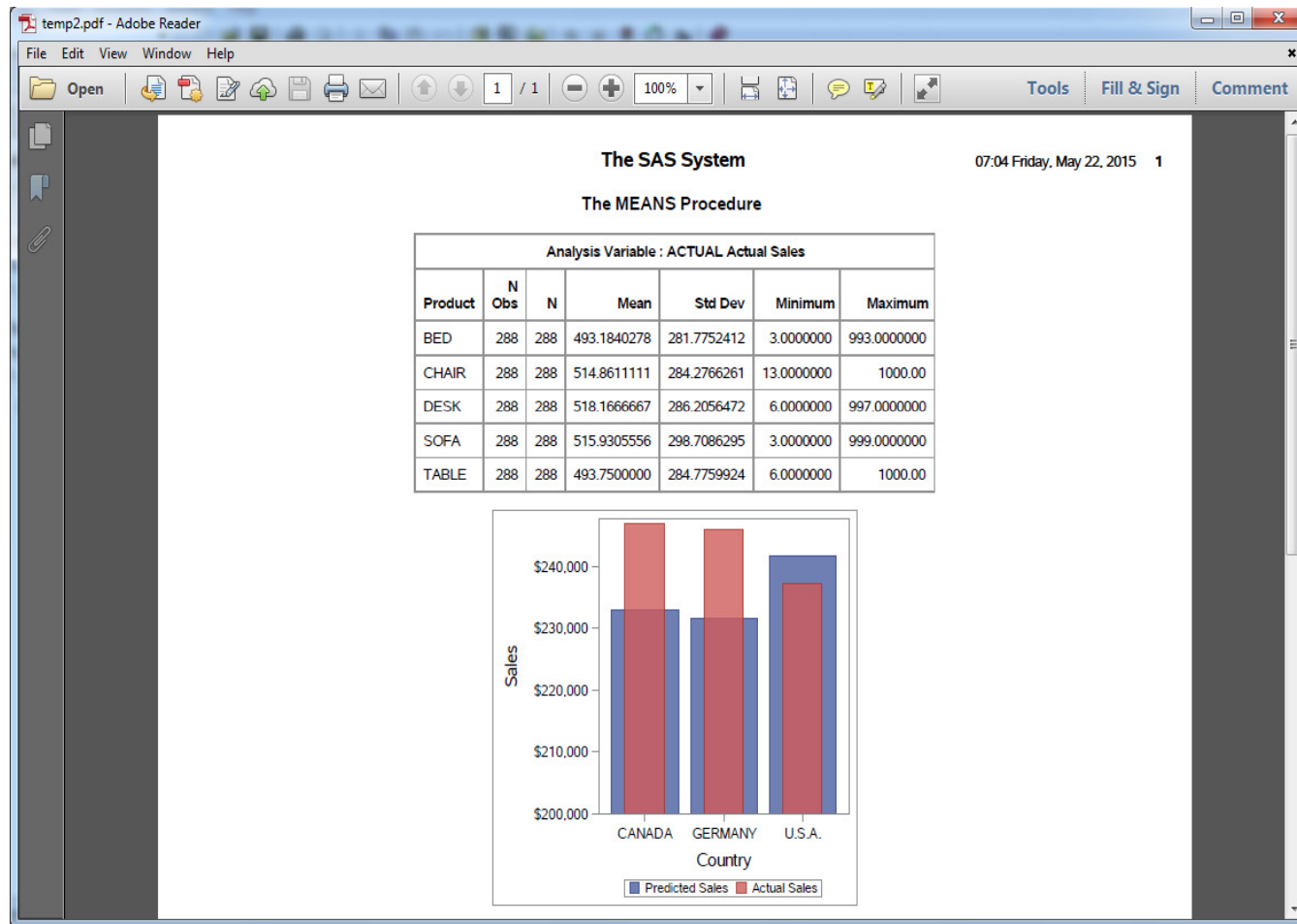
```
ods pdf file="c:\temp1.pdf" startpage=no;
```

```
proc means data=sashelp.prdsale;  
class product;  
var actual;  
run;
```

```
proc sgplot data=sashelp.prdsale;  
  yaxis label="Sales" min=200000;  
  vbar country / response=predict;  
  vbar country / response=actual  
    barwidth=0.5  
    transparency=0.2;  
run;
```

```
ods pdf close;
```

# Controlling SAS Output Using ODS PDF-STARTPAGE=



# Controlling SAS Output Using ODS PDF-COLUMNS=

```
ods pdf file="c:\temp.pdf" columns=2;  
  
proc report data=sashelp.class;  
run;  
  
proc sgplot data=sashelp.class;  
vbar age;  
run;  
  
ods pdf close;
```

# Controlling SAS Output Using ODS PDF-COLUMNS=

The screenshot displays the SAS Results Viewer interface. The window title is "Results Viewer - temp". The toolbar includes navigation and tool icons, a page indicator "1 / 1", a zoom level of "75.8%", and buttons for "Tools", "Fill & Sign", and "Comment".

On the left, a "Bookmarks" pane shows a tree structure of report components:

- The Report Procedure
  - Detailed and/or summarized report
    - Table 1
  - The SGPlot Procedure
    - The SGPlot Procedure

The main content area is split into two columns. The left column contains a table with the following data:

Name	Sex	Age	Height	Weight
Joyce	F	11	51.3	50.5
Thomas	M	11	57.5	85
James	M	12	57.3	83
Jane	F	12	59.8	84.5
John	M	12	59	99.5
Louise	F	12	56.3	77
Robert	M	12	64.8	128
Alice	F	13	56.5	84
Barbara	F	13	65.3	98
Jeffrey	M	13	62.5	84
Alfred	M	14	69	112.5
Carol	F	14	62.8	102.5
Henry	M	14	63.5	102.5
Judy	F	14	64.3	90

The right column contains a bar chart titled "05:40 Wednesday, May 6, 2015 1". The chart plots "Frequency" on the y-axis (ranging from 0 to 5) against "Age" on the x-axis (ranging from 11 to 16). The bars represent the frequency of each age group: Age 11 has a frequency of 2, Age 12 has a frequency of 5, Age 13 has a frequency of 3, Age 14 has a frequency of 4, Age 15 has a frequency of 4, and Age 16 has a frequency of 1.



# Controlling SAS Output Using ODS PDF-Bookmarklist

The screenshot shows the SAS Results Viewer interface. The main window displays a table titled "Budget Across Countries" with the following data:

Actual Sales	Predicted Sales	Country	Region	Division	Product type	Product	Quarter	Year	Month
\$925.00	\$850.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Jan
\$999.00	\$297.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Feb
\$608.00	\$846.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Mar
\$642.00	\$533.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Apr
\$656.00	\$646.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	May
\$948.00	\$486.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Jun
\$612.00	\$717.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Jul
\$114.00	\$564.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Aug
\$685.00	\$230.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Sep
\$657.00	\$494.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Oct
\$608.00	\$903.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Nov
\$353.00	\$266.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Dec
\$107.00	\$190.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Jan
\$354.00	\$139.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Feb
\$101.00	\$217.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Mar

The left sidebar shows a "Bookmarks" panel with a tree structure:

- The Report Procedure
  - Detailed and/or summarized report (highlighted with a blue arrow)
  - Table 1
- The GChart Procedure
  - Bar chart of YEAR
- The Tabulate Procedure
  - Cross-tabular summary report
  - Table 1

# Controlling SAS Output Using ODS PDF-Bookmarklist

```
ods pdf file="temp.pdf" pdftoc=1;  
proc report data=sashelp.prdsale;  
run;  
  
proc gchart data=sashelp.prdsale;  
vbar year;  
run;  
quit;  
  
proc tabulate data=sashelp.prdsale;  
class year product;  
table year, product;  
run;  
ods pdf close;
```

# Controlling SAS Output Using ODS PDF-Bookmarklist

The screenshot shows the SAS Results Viewer interface. The main window displays a table titled "Budget Across Countries" with the following data:

Actual Sales	Predicted Sales	Country	Region	Division	Product type	Product	Quarter	Year	Month
\$925.00	\$850.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Jan
\$999.00	\$297.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Feb
\$608.00	\$846.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1993	Mar
\$642.00	\$533.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Apr
\$656.00	\$646.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	May
\$948.00	\$486.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	2	1993	Jun
\$612.00	\$717.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Jul
\$114.00	\$564.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Aug
\$685.00	\$230.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	3	1993	Sep
\$657.00	\$494.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Oct
\$608.00	\$903.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Nov
\$353.00	\$266.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	4	1993	Dec
\$107.00	\$190.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Jan
\$354.00	\$139.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Feb
\$101.00	\$217.00	CANADA	EAST	EDUCATION	FURNITURE	SOFA	1	1994	Mar

The left sidebar contains a "Bookmarks" panel with three entries: "The Report Procedure", "The GChart Procedure", and "The Tabulate Procedure". A blue arrow points to "The Report Procedure".

# Controlling SAS Output Using ODS Markup

- ODS destinations:

- ExcelXP
- MSOffice2K
- CSV
- Other custom tagsets:

[support.sas.com/rnd/base/ods/odsmarkup/index.html](http://support.sas.com/rnd/base/ods/odsmarkup/index.html)

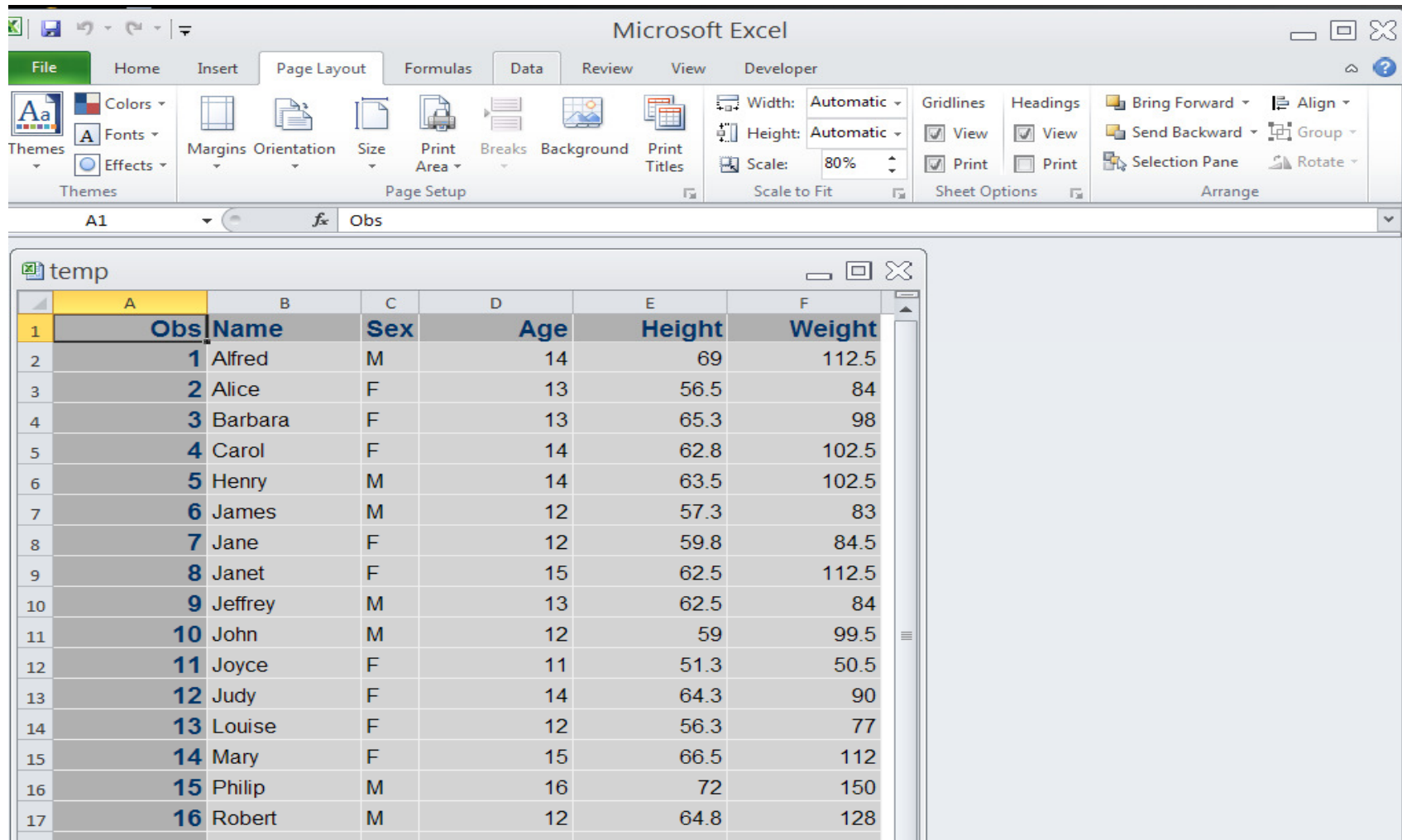
- Tagsets.MSoffice2K\_X
- Tagsets.TableEditor

# Controlling SAS Output Using ODS ExcelXP-Printing Options

```
ods tagsets.excelxp file="temp.xml"
options(orientation="landscape"
        print_header=`&L Page &n of &P`
        print_footer=`&R Confidential`
        scale="80"
        );

proc print data=sashelp.class;
run;
ods tagsets.excelxp close;
```

# Controlling SAS Output Using ODS ExcelXP- Printing Options



The screenshot shows the Microsoft Excel interface with the 'Page Layout' ribbon selected. The active worksheet is named 'temp' and contains a table with 17 rows and 6 columns. The columns are labeled 'Obs', 'Name', 'Sex', 'Age', 'Height', and 'Weight'. The data is as follows:

	A	B	C	D	E	F
1	Obs	Name	Sex	Age	Height	Weight
2	1	Alfred	M	14	69	112.5
3	2	Alice	F	13	56.5	84
4	3	Barbara	F	13	65.3	98
5	4	Carol	F	14	62.8	102.5
6	5	Henry	M	14	63.5	102.5
7	6	James	M	12	57.3	83
8	7	Jane	F	12	59.8	84.5
9	8	Janet	F	15	62.5	112.5
10	9	Jeffrey	M	13	62.5	84
11	10	John	M	12	59	99.5
12	11	Joyce	F	11	51.3	50.5
13	12	Judy	F	14	64.3	90
14	13	Louise	F	12	56.3	77
15	14	Mary	F	15	66.5	112
16	15	Philip	M	16	72	150
17	16	Robert	M	12	64.8	128

# Controlling SAS Output Using ODS ExcelXP- Printing Options

The screenshot shows the Microsoft Excel interface with the 'Page Setup' dialog box open. The dialog box is set to the 'Page' tab and shows the following settings:

- Orientation:** Landscape (selected)
- Scaling:** Adjust to: 80 % normal size
- Paper size:** Letter
- Print quality:** 300 dpi
- First page number:** Auto

The background shows a data table with the following content:

	A	B	C	D
1	Obs	Name	Sex	Age
2	1	Alfred	M	14
3	2	Alice	F	13
4	3	Barbara	F	13
5	4	Carol	F	14
6	5	Henry	M	14
7	6	James	M	12
8	7	Jane	F	12
9	8	Janet	F	15
10	9	Jeffrey	M	13
11	10	John	M	12
12	11	Joyce	F	11
13	12	Judy	F	14
14	13	Louise	F	12
15	14	Mary	F	15
16	15	Philip	M	16
17	16	Robert	M	12

# Controlling SAS Output Using ODS ExcelXP- Printing Options

The screenshot shows the Microsoft Excel interface with the Page Setup dialog box open. The dialog box has four tabs: Page, Margins, Header/Footer, and Sheet. The Header/Footer tab is selected. The dialog box displays the following options:

- Page: Page 1 of 1
- Header: Page ? of 1 (dropdown menu)
- Custom Header... (button)
- Custom Footer... (button)
- Footer: Confidential (dropdown menu)
- Confidential (text in the footer area)
- Different odd and even pages
- Different first page
- Scale with document
- Align with page margins
- Print... (button)
- Print Preview (button)
- Options... (button)
- OK (button)
- Cancel (button)

The spreadsheet in the background has the following data:

	A	B	C	D
1	Obs	Name	Sex	Age
2	1	Alfred	M	14
3	2	Alice	F	13
4	3	Barbara	F	13
5	4	Carol	F	14
6	5	Henry	M	14
7	6	James	M	12
8	7	Jane	F	12
9	8	Janet	F	15
10	9	Jeffrey	M	13
11	10	John	M	12
12	11	Joyce	F	11
13	12	Judy	F	14
14	13	Louise	F	12
15	14	Mary	F	15
16	15	Philip	M	16
17	16	Robert	M	12



# Controlling SAS Output Using ODS ExcelXP- Display Options

```
ods tagsets.excelxp file="c:\temp.xml"  
  options(sheet_name="#byval(country)"  
    frozen_headers="yes"  
    frozen_rowheaders="1"  
    zoom="80"  
    autofilter="yes"  
    suppress_bylines="yes"  
    embedded_titles="yes"  
    embedded_footnotes="yes")  
  style=htmlblue;  
  
proc print data=prdsale;  
  title "Display Options";  
  by country;  
run;  
ods tagsets.excelxp close;
```

# Controlling SAS Output Using ODS ExcelXP- Display Options

Filters

Frozen headers

	A	B	C	D	E	F	G	H	I	J	K				
1	Display Options														
2															
3	OI-	ACTU/-	PREDI/-	REGION	-	DIVISION	-	PRODTYPE	-	PRODUCT	-	QUART	-	YE/-	MON-
4	1	\$925.00	\$850.00	EAST		EDUCATION		FURNITURE		SOFA		1		1993	Jan
5	2	\$999.00	\$297.00	EAST		EDUCATION		FURNITURE		SOFA		1		1993	Feb
6	3	\$608.00	\$846.00	EAST		EDUCATION		FURNITURE		SOFA		1		1993	Mar
7	4	\$642.00	\$533.00	EAST		EDUCATION		FURNITURE		SOFA		2		1993	Apr
8	5	\$656.00	\$646.00	EAST		EDUCATION		FURNITURE		SOFA		2		1993	May
9	6	\$948.00	\$486.00	EAST		EDUCATION		FURNITURE		SOFA		2		1993	Jun
10	7	\$612.00	\$717.00	EAST		EDUCATION		FURNITURE		SOFA		3		1993	Jul
11	8	\$114.00	\$564.00	EAST		EDUCATION		FURNITURE		SOFA		3		1993	Aug
12	9	\$685.00	\$230.00	EAST		EDUCATION		FURNITURE		SOFA		3		1993	Sep
13	10	\$657.00	\$494.00	EAST		EDUCATION		FURNITURE		SOFA		4		1993	Oct
14	11	\$608.00	\$903.00	EAST		EDUCATION		FURNITURE		SOFA		4		1993	Nov
15	12	\$353.00	\$266.00	EAST		EDUCATION		FURNITURE		SOFA		4		1993	Dec
16	13	\$107.00	\$190.00	EAST		EDUCATION		FURNITURE		SOFA		1		1994	Jan
17	14	\$354.00	\$139.00	EAST		EDUCATION		FURNITURE		SOFA		1		1994	Feb
18	15	\$101.00	\$217.00	EAST		EDUCATION		FURNITURE		SOFA		1		1994	Mar
19	16	\$553.00	\$560.00	EAST		EDUCATION		FURNITURE		SOFA		2		1994	Apr
20	17	\$877.00	\$148.00	EAST		EDUCATION		FURNITURE		SOFA		2		1994	May
21	18	\$431.00	\$762.00	EAST		EDUCATION		FURNITURE		SOFA		2		1994	Jun

Navigation: CANADA | GERMANY | U.S.A. | (+) | < | >

READY | [Grid Icon]

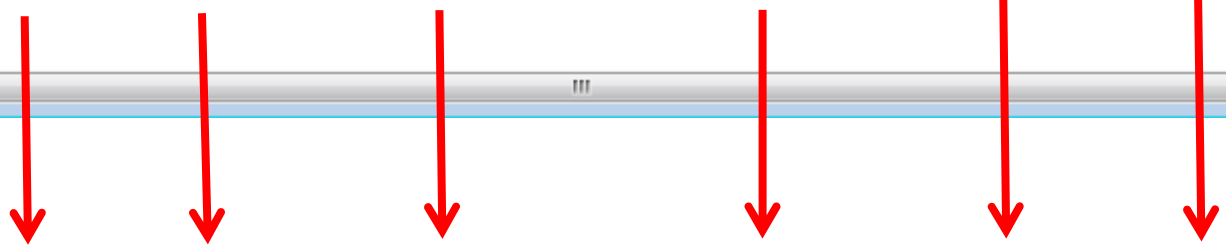
# Controlling SAS Output Using ODS ExcelXP-Cell Formatting

Output - (Untitled)

Default listing output

Leading	Range	Scientific	Thousands	Character	Number
0001	04-21	123456789101112145	1,000	0000E110	45.00
0002	05-20	333434455555544334	2,000	0000E120	48.00
0003	06-21	123456789101112145	3,000	0000E130	67.00

SAS



Leading	Range	Scientific	Thousands	Character	Number
1	21-Apr	1.23457E+17	1000	0.00E+00	45
2	20-May	3.33434E+17	2000	0.00E+00	48
3	21-Jun	1.23457E+17	3000	0.00E+00	67

Excel

# Controlling SAS Output Using ODS-ExcelXP-Cell Formatting

Destination	Style Attribute	Parameter	Excel Version
ExcelXP	TAGATTR=	format:	Excel 2002 +
Msoffice2k / HTML	HTMLSTYLE=	mso-number-format	Excel 2000 +
HTML3	HTMLSTYLE/ HTMLCLASS	mso-number-format	Excel 97+
CSV	No Formatting	N/A	N/A

# Controlling SAS Output Using ODS ExcelXP-Cell Formatting

Character	Description
0	Pads the value with zeros.
#	Does not display extra zeros.
?	Leaves a space for insignificant zeros.
. (period)	Displays decimal number.
%	Multiplies by 100 and displays the value as a percentage.
, (comma)	Uses a thousands separator.
Text Code	Description
\character	Displays the character that you specify.
"text"	Displays the value as text.
*	Repeats a character to fill the format.
_ (underscore)	Skips the width of the next character.
@	Is a text placeholder.
Date Code	Description
M/D/YYYY	Formats a data as Month/Day/Year.
Miscellaneous	Description
[BLACK], [BLUE],...[COLOR n]	Display the characters in the specified colors. <i>n</i> is a value from 1 to 56 .

# Controlling SAS Output Using ODS ExcelXP-Cell Formatting

```
ods tagsets.excelxp file="temp.xls" style=normal;

proc print data=one;
  format leading z4.;
  var leading / style(data)={tagattr="format:@"};
  var range / style(data)={tagattr="format:@"};
  var scientific / style(data)={tagattr="type:String"};
  var thousands / style(data)={tagattr="format:#,###"};
  var character / style(data)={tagattr="format:@"};
  var number / style(data)={tagattr="format:##"};

run;

ods tagsets.excelxp close;
```

# Controlling SAS Output Using ODS ExcelXP-Cell Formatting

The screenshot shows the Microsoft Excel interface with a table titled "Table 1 - Data Set WORK.ONE". The table has the following data:

	A	B	C	D	E	F	G
1	Leading	Range	Scientific	Thousands	Character	Number	
2	0001	04-21	123456789101112145	1,000	0000E110	45	
3	0002	05-20	333434455555544334	2,000	0000E120	48	
4	0003	06-21	123456789101112145	3,000	0000E130	67	
5							
6							

# Controlling SAS Output Using ODS ExcelXP-Cell Formatting

The screenshot displays the Microsoft Excel interface with the 'Format Cells' dialog box open for cell B2. The dialog is configured with the following settings:

- Category: Number
- Sample: \$925
- Type: \$#,##0\_);[Red](\$#,##0)

The background spreadsheet shows the following data:

Obs	ACTUAL	PRE
1	\$925.00	\$8
2	\$999.00	\$2
3	\$608.00	\$8
4	\$642.00	\$5
5	\$656.00	\$6
6	\$948.00	\$4
7	\$612.00	\$7
8	\$114.00	\$5
9	\$685.00	\$2
10	\$657.00	\$4
11	\$608.00	\$9
12	\$353.00	\$2
13	\$107.00	\$1
14	\$354.00	\$1
15	\$101.00	\$2
16	\$553.00	\$5
17	\$877.00	\$1
18	\$431.00	\$7
19	\$511.00	\$4



# Controlling SAS Output Using ODS ExcelXP- Formats and Formulas

```
ods tagsets.excelxp file='c:\wformulas.xls' style=normal;  
  
proc report data=sashelp.prdsale;  
  where country eq 'CANADA' and year eq 1993;  
  column prodtype productyear actual predict difference;  
  define predict / style(column)={tagattr='format:Currency'};  
  define actual / style(column)={tagattr='format:Currency'};  
  define difference / computed style(column)=  
    {tagattr='format:Currency formula:RC[-1]-RC[-2]'};  
run;  
  
ods tagsets.excelxp close;
```

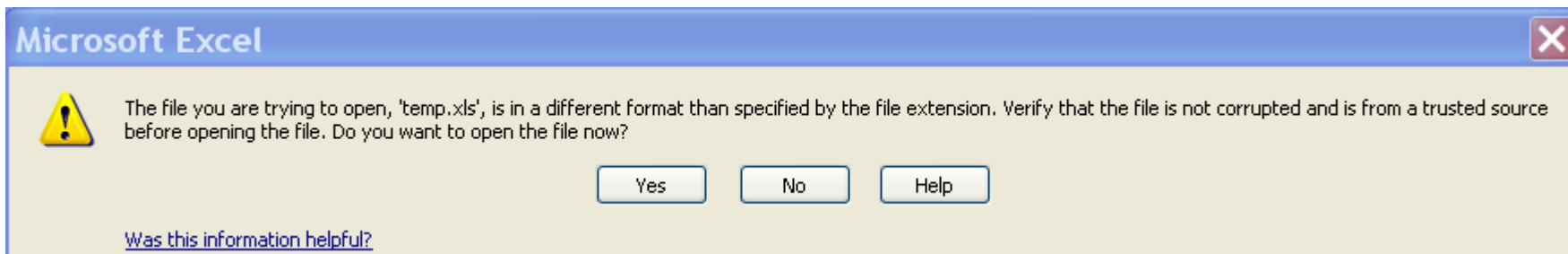
# Controlling SAS Output Using ODS ExcelXP- Formats and Formulas

The screenshot displays the Microsoft Excel interface with a table of furniture sales data. The formula bar shows the formula  $=E7-D7$  for cell F7. A blue arrow points to cell D7, which contains the value \$948.00. The table has the following data:

	A	B	C	D	E	F	G	H	I	J
1	Product type	Product	Year	Actual Sales	Predicted Sales	Difference				
2	FURNITURE	SOFA	1993	\$925.00	\$850.00	(\$75.00)				
3	FURNITURE	SOFA	1993	\$999.00	\$297.00	(\$702.00)				
4	FURNITURE	SOFA	1993	\$608.00	\$846.00	\$238.00				
5	FURNITURE	SOFA	1993	\$642.00	\$533.00	(\$109.00)				
6	FURNITURE	SOFA	1993	\$656.00	\$646.00	(\$10.00)				
7	FURNITURE	SOFA	1993	\$948.00	\$486.00	(\$462.00)				
8	FURNITURE	SOFA	1993	\$612.00	\$717.00	\$105.00				
9	FURNITURE	SOFA	1993	\$114.00	\$564.00	\$450.00				
10	FURNITURE	SOFA	1993	\$685.00	\$230.00	(\$455.00)				
11	FURNITURE	SOFA	1993	\$657.00	\$494.00	(\$163.00)				
12	FURNITURE	SOFA	1993	\$608.00	\$903.00	\$295.00				
13	FURNITURE	SOFA	1993	\$353.00	\$266.00	(\$87.00)				
14	FURNITURE	BED	1993	\$220.00	\$585.00	\$365.00				
15	FURNITURE	BED	1993	\$444.00	\$267.00	(\$177.00)				
16	FURNITURE	BED	1993	\$178.00	\$487.00	\$309.00				
17	FURNITURE	BED	1993	\$756.00	\$764.00	\$8.00				

# Controlling SAS Output Using ODS-ExcelXP –Dialog Warnings

```
ods tagsets.ExcelXP file="c:\temp.xls";  
  
proc print data=sashelp.class;  
run;  
  
ods tagsets.excelxp close;
```

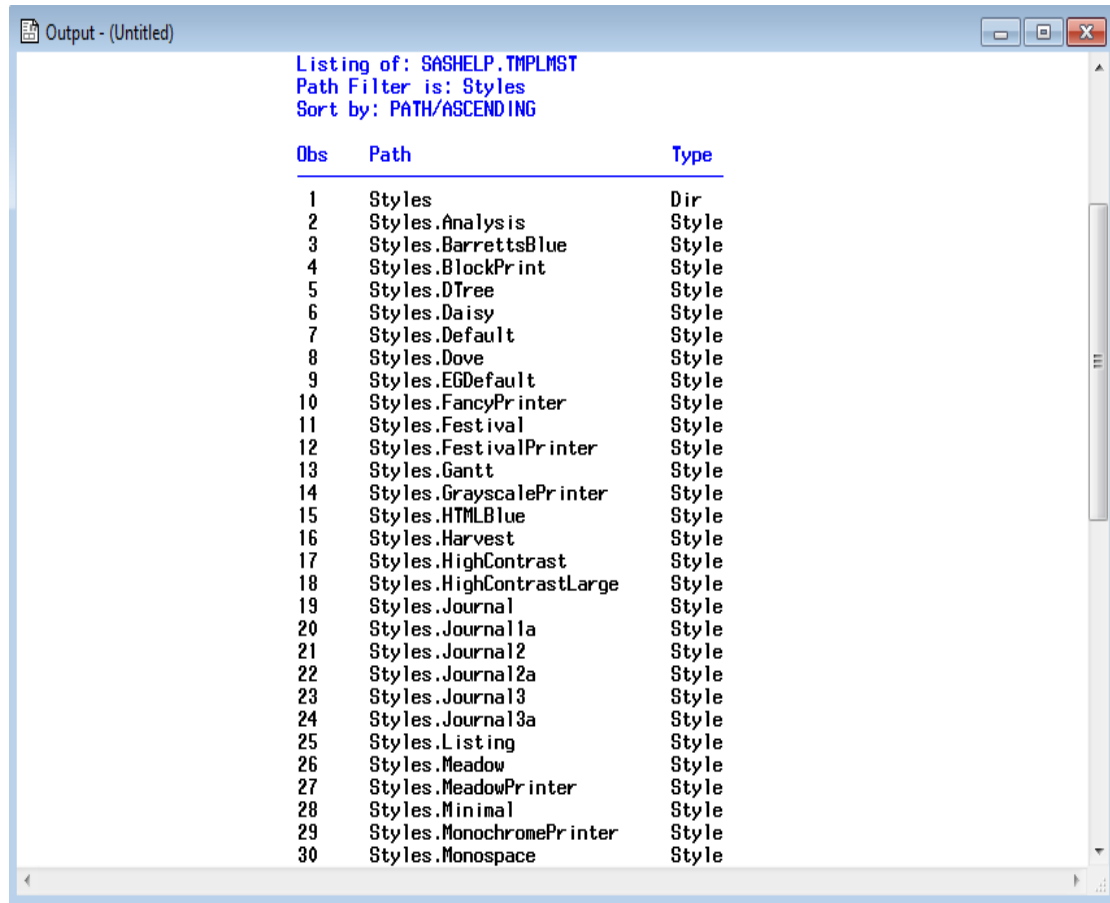


# Formatting your ODS Output

- Listing and viewing available styles
- Modifying the styles of your ODS Output
- Applying styles to tabular output using the STYLE=
- Formatting text using inline styles

# Listing and Viewing Available Styles

```
proc template;  
  list styles;  
run;
```

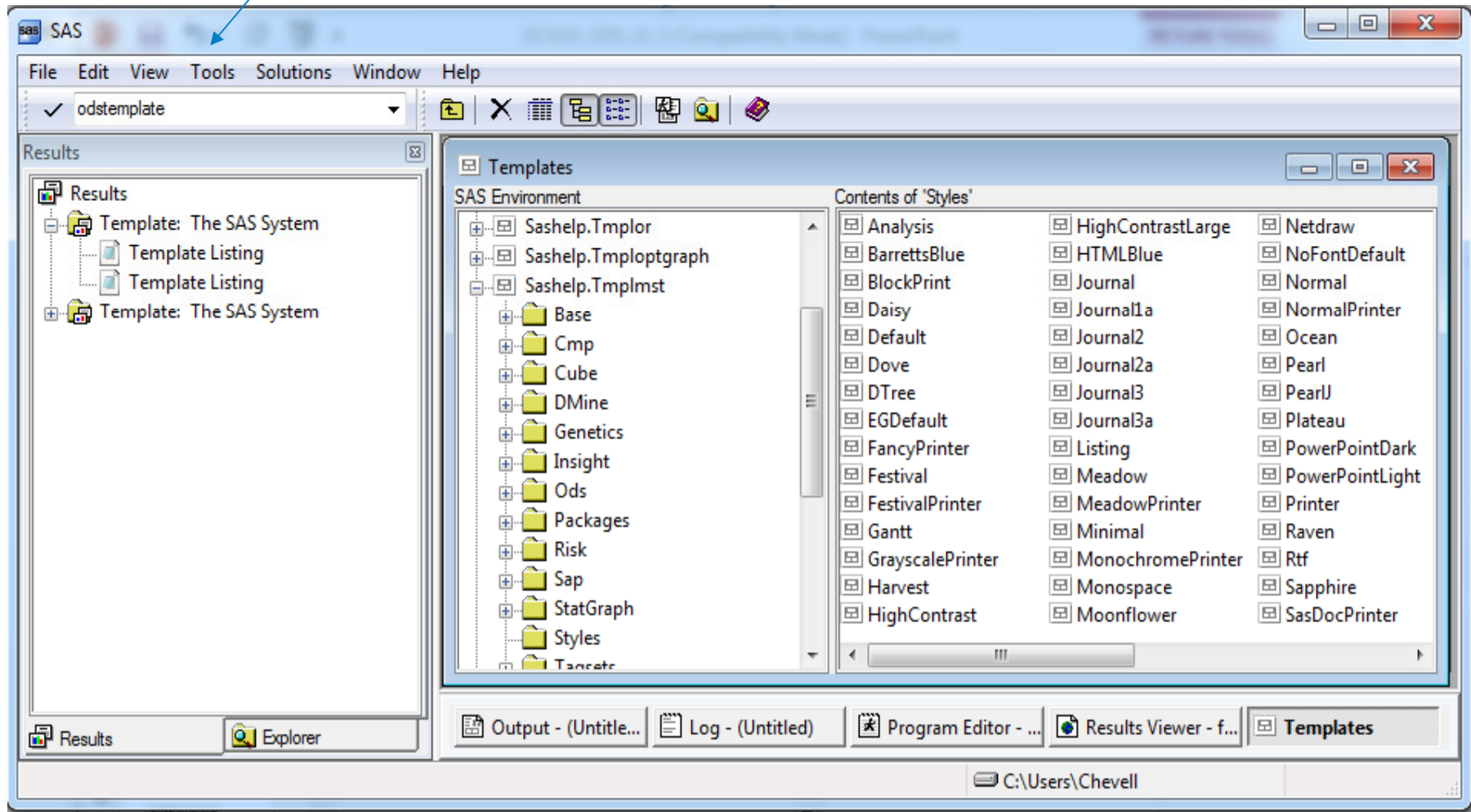


Listing of: SASHELP.TPLMST  
Path Filter is: Styles  
Sort by: PATH/ASCENDING

Obs	Path	Type
1	Styles	Dir
2	Styles.Analysis	Style
3	Styles.BarrettsBlue	Style
4	Styles.BlockPrinter	Style
5	Styles.DTree	Style
6	Styles.Daisy	Style
7	Styles.Default	Style
8	Styles.Dove	Style
9	Styles.EGDefault	Style
10	Styles.FancyPrinter	Style
11	Styles.Festival	Style
12	Styles.FestivalPrinter	Style
13	Styles.Gantt	Style
14	Styles.GrayscalePrinter	Style
15	Styles.HTMLBlue	Style
16	Styles.Harvest	Style
17	Styles.HighContrast	Style
18	Styles.HighContrastLarge	Style
19	Styles.Journal	Style
20	Styles.Journal1a	Style
21	Styles.Journal2	Style
22	Styles.Journal2a	Style
23	Styles.Journal3	Style
24	Styles.Journal3a	Style
25	Styles.Listing	Style
26	Styles.Meadow	Style
27	Styles.MeadowPrinter	Style
28	Styles.Minimal	Style
29	Styles.MonochromePrinter	Style
30	Styles.Monospace	Style

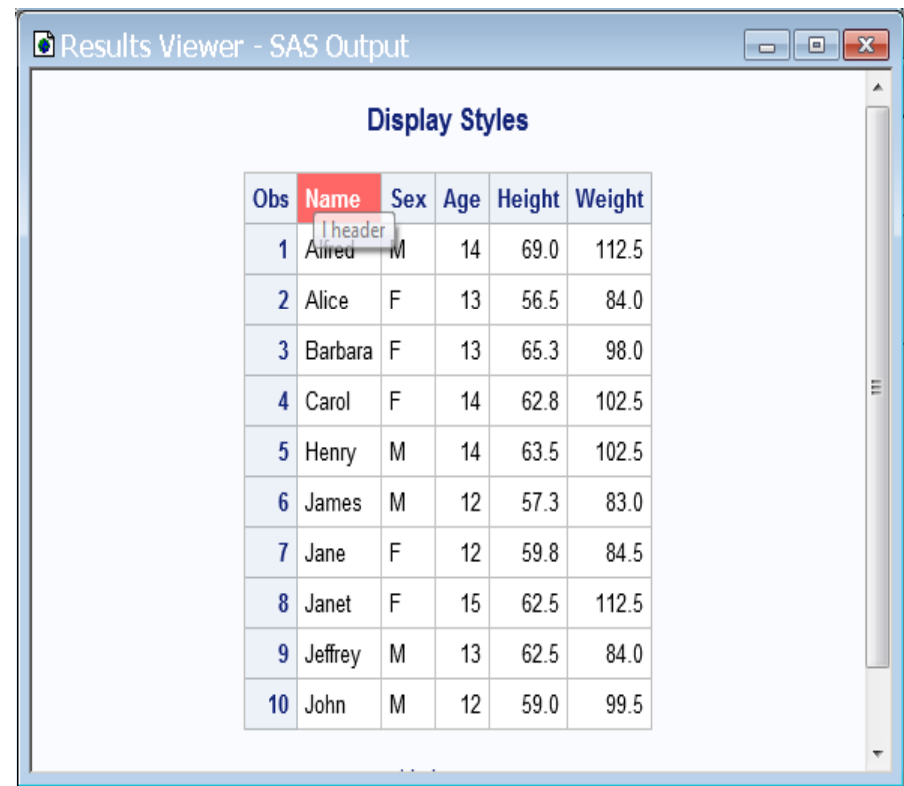
# Listing and Viewing Available Styles

Interactive command



# Listing and Viewing Available Styles-Visual

```
ods tagsets.style_popup  
  file="temp.html";  
  
proc print data=sashelp.class;  
run;  
  
ods tagsets.style_popup close;
```

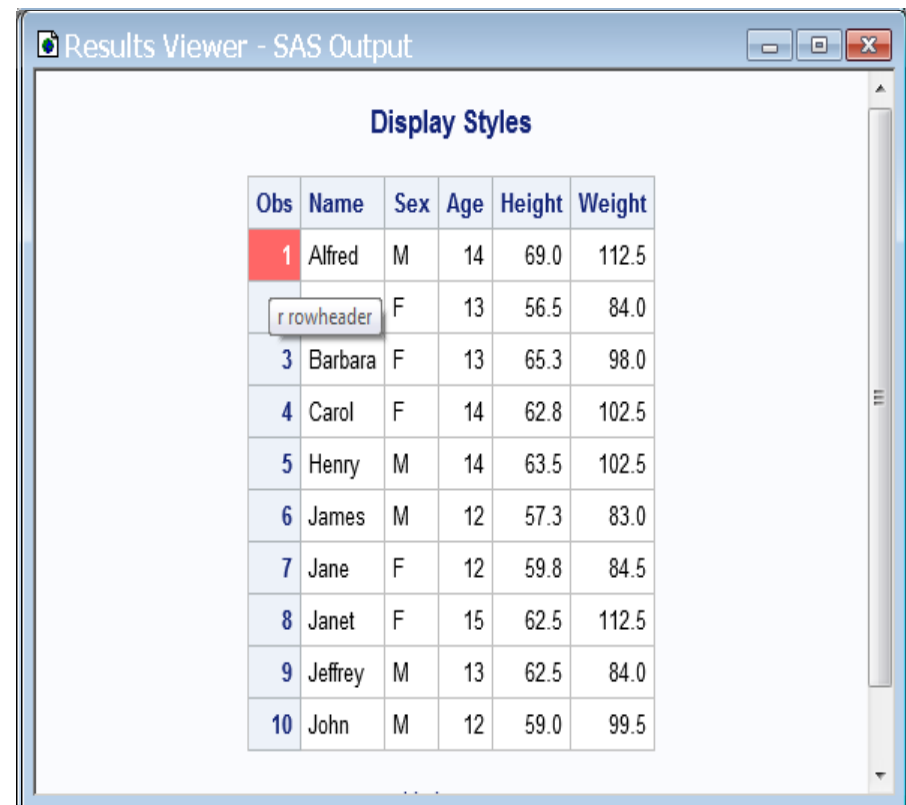


The screenshot shows a window titled "Results Viewer - SAS Output". Inside the window, there is a table titled "Display Styles". The table has 10 rows and 6 columns: Obs, Name, Sex, Age, Height, and Weight. The first row is highlighted in red, and a tooltip "Header" is visible over the "Name" cell of the first row.

Obs	Name	Sex	Age	Height	Weight
1	Afred	M	14	69.0	112.5
2	Alice	F	13	56.5	84.0
3	Barbara	F	13	65.3	98.0
4	Carol	F	14	62.8	102.5
5	Henry	M	14	63.5	102.5
6	James	M	12	57.3	83.0
7	Jane	F	12	59.8	84.5
8	Janet	F	15	62.5	112.5
9	Jeffrey	M	13	62.5	84.0
10	John	M	12	59.0	99.5

# Listing and Viewing Available Styles-Visual

```
ods tagsets.style_popup  
  file="temp.html";  
  
proc print data=sashelp.class;  
run;  
  
ods tagsets.style_popup close;
```



Results Viewer - SAS Output

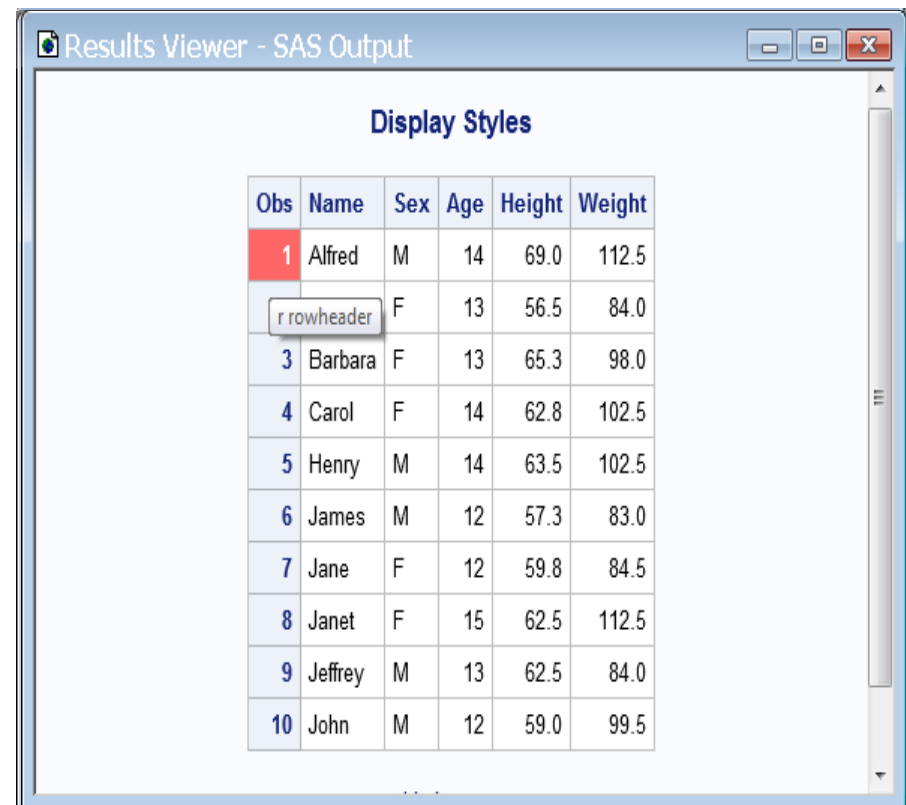
Display Styles

Obs	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69.0	112.5
2	rowheader	F	13	56.5	84.0
3	Barbara	F	13	65.3	98.0
4	Carol	F	14	62.8	102.5
5	Henry	M	14	63.5	102.5
6	James	M	12	57.3	83.0
7	Jane	F	12	59.8	84.5
8	Janet	F	15	62.5	112.5
9	Jeffrey	M	13	62.5	84.0
10	John	M	12	59.0	99.5



# Listing and Viewing Available Styles-Visual

```
ods tagsets.style_popup  
  file="temp.html";  
  
proc print data=sashelp.class;  
run;  
  
ods tagsets.style_popup close;
```



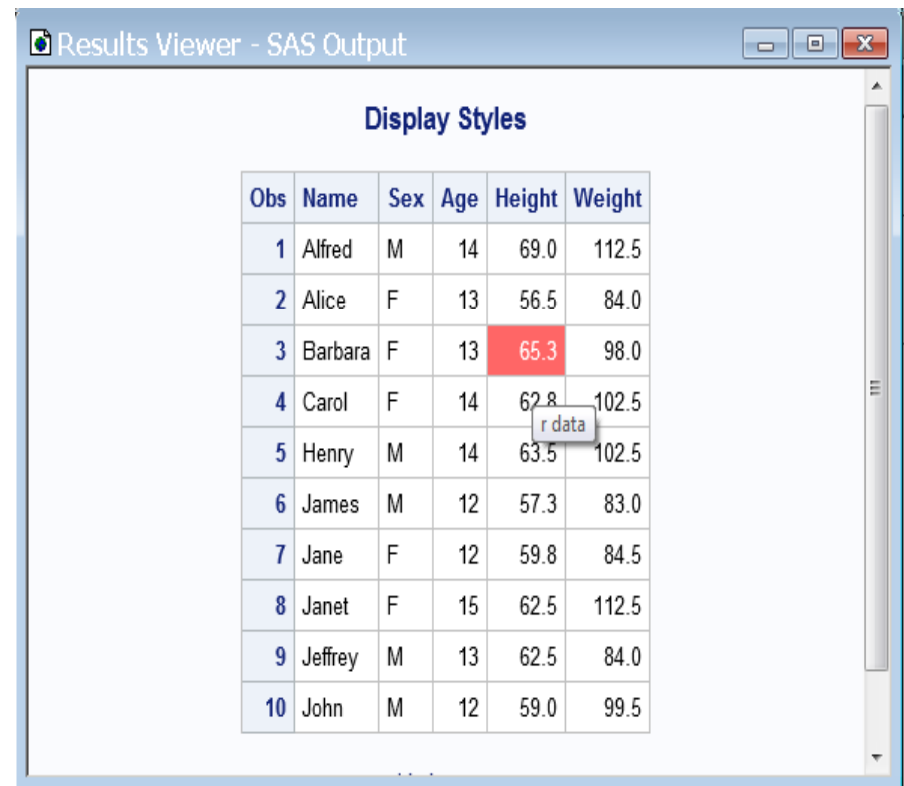
Results Viewer - SAS Output

Display Styles

Obs	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69.0	112.5
2	rowheader	F	13	56.5	84.0
3	Barbara	F	13	65.3	98.0
4	Carol	F	14	62.8	102.5
5	Henry	M	14	63.5	102.5
6	James	M	12	57.3	83.0
7	Jane	F	12	59.8	84.5
8	Janet	F	15	62.5	112.5
9	Jeffrey	M	13	62.5	84.0
10	John	M	12	59.0	99.5

# Listing and Viewing Available Styles-Visual

```
ods tagsets.style_popup  
  file="temp.html";  
  
proc print data=sashelp.class;  
run;  
  
ods tagsets.style_popup close;
```



The screenshot shows a window titled "Results Viewer - SAS Output". Inside the window, there is a table titled "Display Styles". The table has six columns: Obs, Name, Sex, Age, Height, and Weight. The data is as follows:

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
4	Carol	F	14	62.8	102.5
5	Henry	M	14	63.5	102.5
6	James	M	12	57.3	83.0
7	Jane	F	12	59.8	84.5
8	Janet	F	15	62.5	112.5
9	Jeffrey	M	13	62.5	84.0
10	John	M	12	59.0	99.5

A tooltip is visible over the value 62.8 in the Height column for observation 4, displaying the text "r data".

# Formatting your ODS Output- Proc Template

```
proc template;  
  define style styles.newstyle;  
    parent=styles.htmlblue;  
    class header,rowheader /  
      backgroundcolor=beige  
      fontsize=10pt;  
    class data /  
      backgroundcolor=lightbrown;  
  end;  
run;
```

```
ods html file="temp.html" style=styles.newstyle;  
proc print data=sashelp.class;  
run;  
ods html close;
```

Obs	Name	Sex	Age	Height	Weight
1	Joyce	F	11	51.3	50.5
2	Thomas	M	11	57.5	85.0
3	James	M	12	57.3	83.0
4	Jane	F	12	59.8	84.5
5	John	M	12	59.0	99.5
6	Louise	F	12	56.3	77.0
7	Robert	M	12	64.8	128.0
8	Alice	F	13	56.5	84.0
9	Barbara	F	13	65.3	98.0
10	Jeffrey	M	13	62.5	84.0
11	Alfred	M	14	69.0	112.5
12	Carol	F	14	62.8	102.5
13	Henry	M	14	63.5	102.5
14	Judy	F	14	64.3	90.0
15	Janet	F	15	62.5	112.5
16	Mary	F	15	66.5	112.0

# Formatting your ODS Output- Inline Formatting

- Provides functions such as UNICODE, STYLE, NEWLINE, NBSPACE, SUB and SUPER
- Enables nesting of styles which was not possible with the pre-production syntax
- Can use the universal [\*ESC\*] character along with any other valid value on the ODS Escapechar= statement

# Formatting your ODS Output- Inline Formatting

```
ods escapechar="^";
ods pdf file="temp.pdf";

title "^{style[color=red] Red ^{sub nested} ^{style[color=green] now green output
      ^{Unicode 263b }}";
ods pdf text="^{style systemtitle[just=center] Text using the systemtitle style element}";

proc print data=sashelp.class;
run;
ods pdf close;
```

Red<sub>nested</sub> now green output ☺

Text using the systemtitle style element

Obs	Name	Sex	Age	Height	Weight
1	Joyce	F	11	51.3	50.5
2	Thomas	M	11	57.5	85.0
3	James	M	12	57.3	83.0
4	Jane	F	12	59.8	84.5
5	John	M	12	59.0	99.5
6	Louise	F	12	56.3	77.0
7	Robert	M	12	64.8	128.0
8	Alice	F	13	56.5	84.0
9	Barbara	F	13	65.3	98.0
10	Jeffrey	M	13	62.5	84.0
11	Alfred	M	14	69.0	112.5

# Generating Formatted Email using ODS

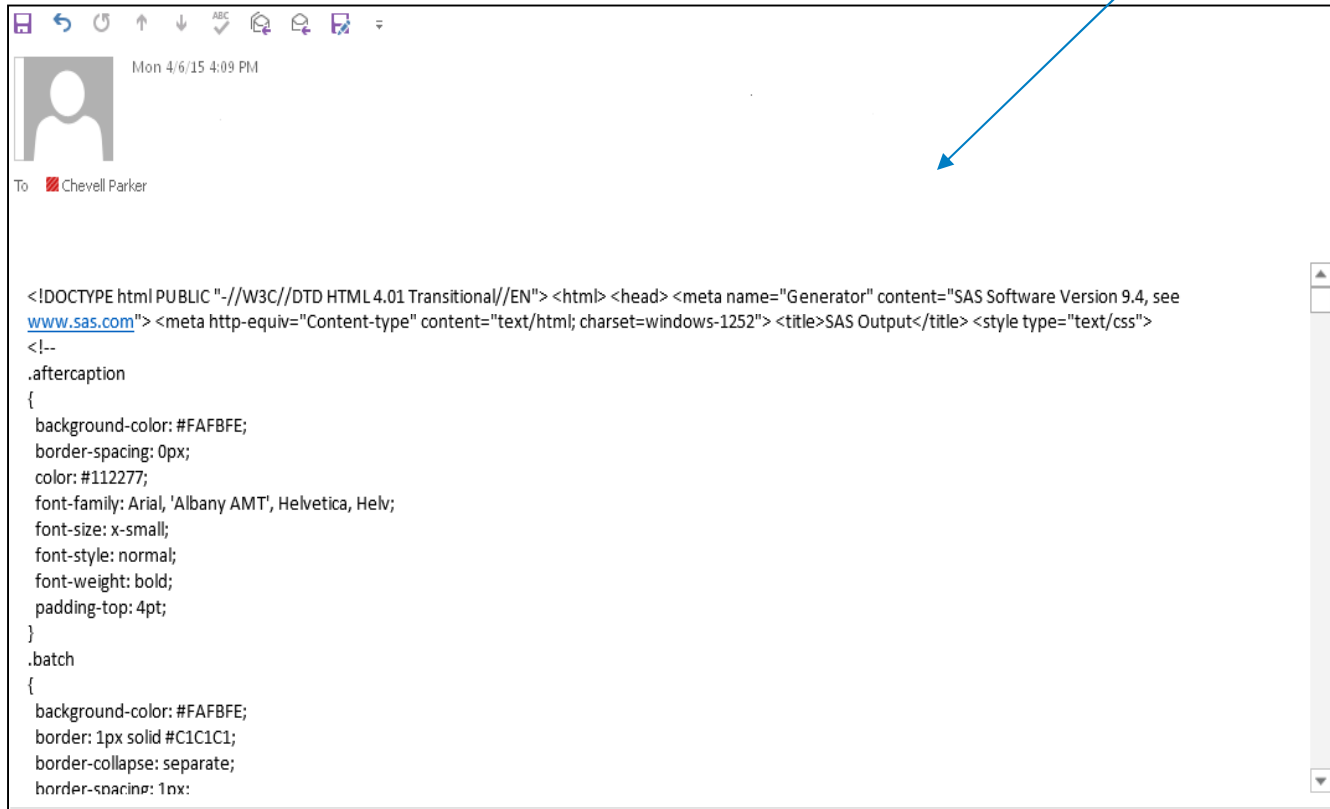
- Email Access Method
- Limitations of Formatted Email
- Challenges with Various Email Clients
- Graphics in Formatted Email

# Email Access Method

```
options emailsys=SMTP emailhost=your-mail-host;  
filename temp email to="recipient-email-address"  
                content-type ="text/html"  
                from="sender-email-address";  
ods html file=temp rs=none;  
proc print data=sashelp.class;  
run;  
ods html close;
```

# Email Access Method: Common Problems

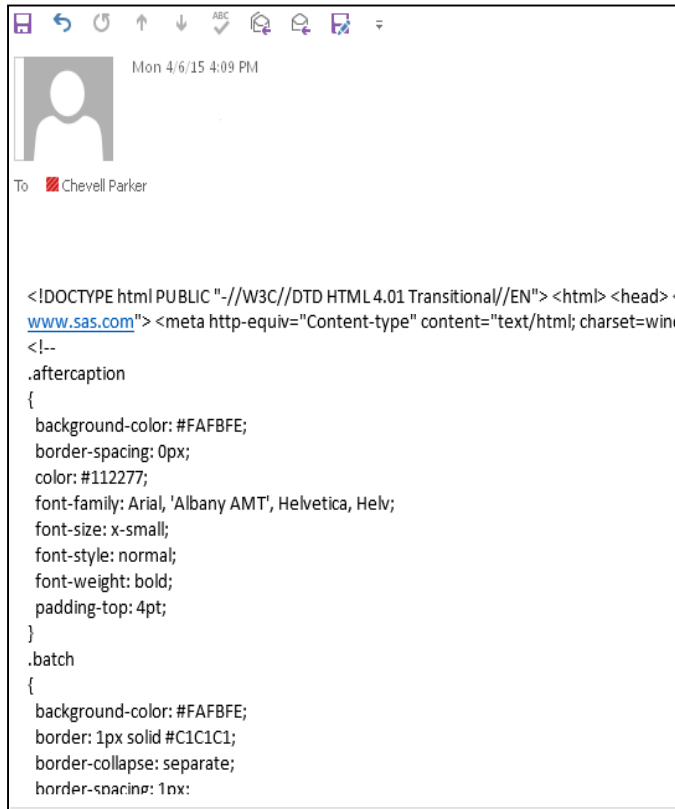
HTML file sent as text





# Email Access Method: Common Problems

Adding DEBUG option on filename statement to display header



```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" > <html > <head >  
www.sas.com> <meta http-equiv="Content-type" content="text/html; charset=win  
<!--  
.aftercaption  
{  
  background-color: #FAFBFE;  
  border-spacing: 0px;  
  color: #112277;  
  font-family: Arial, 'Albany AMT', Helvetica, Helv;  
  font-size: x-small;  
  font-style: normal;  
  font-weight: bold;  
  padding-top: 4pt;  
}  
.batch  
{  
  background-color: #FAFBFE;  
  border: 1px solid #C1C1C1;  
  border-collapse: separate;  
  border-spacing: 1px;
```

```
S: From: sender-email-address  
S: Sender: john.doe@gmail.com  
S: To:  
S: chevell.parker@mars.com  
S: X-Mailer: 9.04.01M3D040515  
S: MIME-Version: 1.0  
S: Content-Type: text/plain;  
S:           charset=iso-8859-1  
S: Content-Transfer-Encoding: 8bit
```

# Limitations of Formatted Email

- File size is limited with formatted email.
- HTML accessibility is not widely supported.
- Scripting is not supported for security reasons.
- Animated images are not supported, for the most part.
- Adobe Flash objects are not supported.
- Certain HTML tagging is not supported.

# Challenges with Various Email Clients

IE


Profit Summary for company ABC

Summary Report  
Date Of 18Feb2015

Obs	Year	Quarter	Product_Line	Quantity	Profit
1	1999	1999Q1	Children	286	4980.15
2	1999	1999Q1	Children	98	1479.95
3	1999	1999Q1	Children	588	9348.95
4	1999	1999Q1	Children	334	7136.80
5	1999	1999Q1	Children	303	7163.00

OUTLOOK

Thu 4/2/15 2:54 PM

 Quarterly Report

To: Chevell Parker

Profit Summary for the Quarter

Summary Report  
Date Of 02APR15

Obs	Year	Quarter	Product_Line	Quantity	Profit
1	1999	1999Q1	Children	286	4980.15
2	1999	1999Q1	Children	98	1479.95
3	1999	1999Q1	Children	588	9348.95
4	1999	1999Q1	Children	334	7136.80
5	1999	1999Q1	Children	303	7163.00

# Challenges with Various Email Clients

## IE

Profit Summary for company ABC

Summary Report  
Date Of 18Feb2015

Obs	Year	Quarter	Product_Line	Quantity	Profit
1	1999	1999Q1	Children	286	4980.15
2	1999	1999Q1	Children	98	1479.95
3	1999	1999Q1	Children	588	9348.95
4	1999	1999Q1	Children	334	7136.80
5	1999	1999Q1	Children	303	7163.00

## GMAIL

Quarterly Report Inbox x

chevell.parker  
to me

Profit Summary for the Quarter

Summary Report  
Date Of 02APR15

Obs	Year	Quarter	Product_Line	Quantity	Profit
1	1999	1999Q1	Children	286	4980.15
2	1999	1999Q1	Children	98	1479.95
3	1999	1999Q1	Children	588	9348.95
4	1999	1999Q1	Children	334	7136.80
5	1999	1999Q1	Children	303	7163.00
6	1999	1999Q1	Children	755	19153.05
7	1999	1999Q1	Children	209	1975.35
8	1999	1999Q1	Children	14	288.80

# Challenges with Various Email Clients

IE

Profit Summary for company ABC

Summary Report  
Date Of 18Feb2015

Obs	Year	Quarter	Product_Line	Quantity	Profit
1	1999	1999Q1	Children	286	4980.15
2	1999	1999Q1	Children	98	1479.95
3	1999	1999Q1	Children	588	9348.95
4	1999	1999Q1	Children	334	7136.80
5	1999	1999Q1	Children	303	7163.00

YAHOO

Quarterly Report People ★

● **chevell.parker** 3:04 PM ★  
To me

Profit Summary for the Quarter

Summary Report  
Date Of 02APR15

Obs	Year	Quarter	Product_Line	Quantity	Profit
1	1999	1999Q1	Children	286	4980.15
2	1999	1999Q1	Children	98	1479.95
3	1999	1999Q1	Children	588	9348.95
4	1999	1999Q1	Children	334	7136.80
5	1999	1999Q1	Children	303	7163.00
6	1999	1999Q1	Children	755	19153.05
7	1999	1999Q1	Children	209	1975.35

# ODS Destinations and Formatted Email

ODS destinations and formatted email:

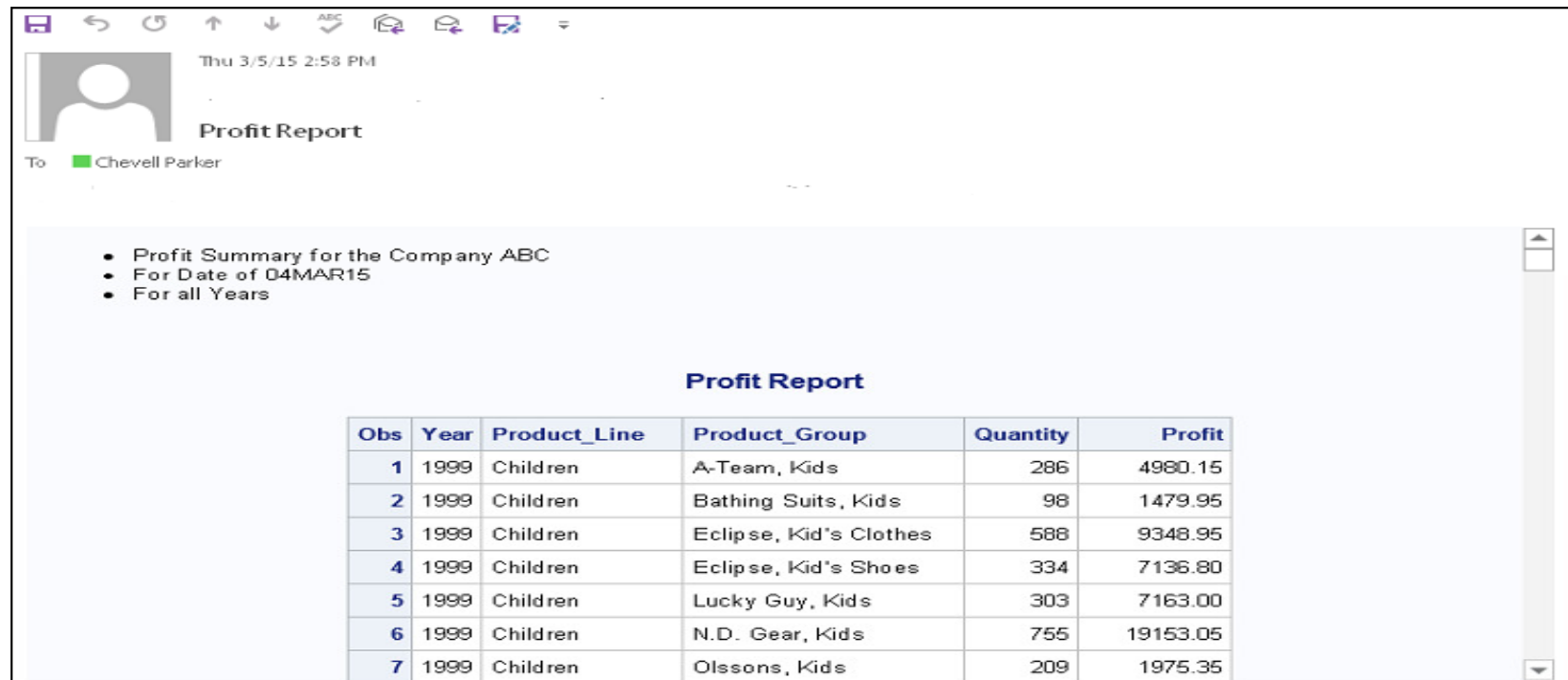
```
ods html3 file=output;  
ods msoffice2k file=output options(pagebreak="no")  
    metatext='name="viewport"content="width=device-  
width"';  
ods tagsets.tableeditor file=output  
    options(format_email='yes'  
            pagebreak="no");
```

# ODS Destinations and Formatted Email

```
. . .previous code. . .  
  
proc odstext;  
  list;  
    item "Profit Summary for the Company ABC";  
    item "For Date of &sysdate";  
    item "For all Years";  
  end;  
  
run;  
  
proc print data=sashelp.orsales;  
run;  
  
ods _all_ close;
```

*(continued)*

# ODS Destinations and Formatted Email



The screenshot shows an email interface with a toolbar at the top. The email header includes a profile picture, the date and time "Thu 3/5/15 2:58 PM", and the subject "Profit Report". The recipient is listed as "To: Chevell Parker". The body of the email contains a bulleted list of details and a table titled "Profit Report".

- Profit Summary for the Company ABC
- For Date of 04MAR15
- For all Years

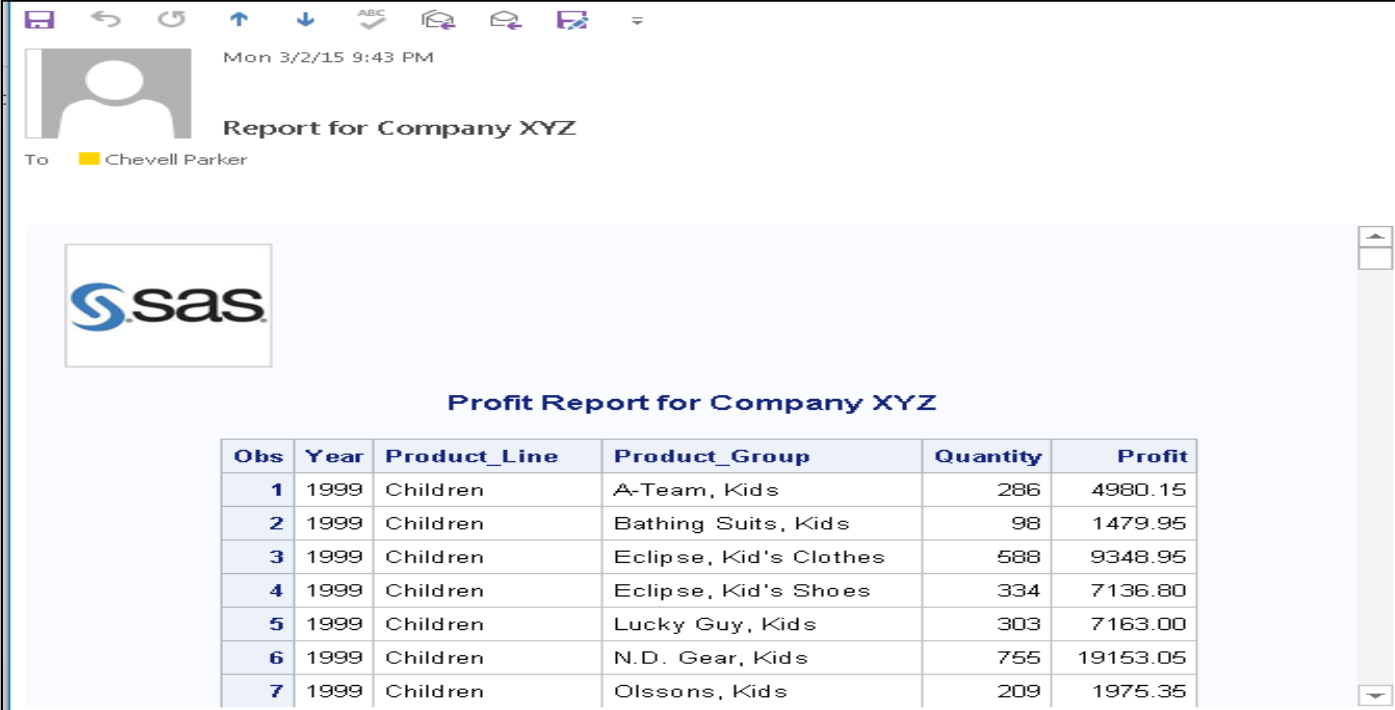
Obs	Year	Product_Line	Product_Group	Quantity	Profit
1	1999	Children	A-Team, Kids	286	4980.15
2	1999	Children	Bathing Suits, Kids	98	1479.95
3	1999	Children	Eclipse, Kid's Clothes	588	9348.95
4	1999	Children	Eclipse, Kid's Shoes	334	7136.80
5	1999	Children	Lucky Guy, Kids	303	7163.00
6	1999	Children	N.D. Gear, Kids	755	19153.05
7	1999	Children	Olssons, Kids	209	1975.35



# Graphics in Formatted Email


```
filename output email to="jane.doe@gmail.com "  
    attach=('C:\SAS.jpg'  
    inlined="logo")  
    subject="Report for Company XYZ"  
    content_type="text/html";  
  
ods msoffice2k file=output rs=none;  
title j=1 '';  
title2 "Profit Report for Company XYZ";  
  
proc print data=sashelp.orsales;  
run;  
  
ods msoffice2k close;
```


# Using Graphics in Formatted Email



Mon 3/2/15 9:43 PM

**Report for Company XYZ**

To  Chevell Parker



**Profit Report for Company XYZ**

Obs	Year	Product_Line	Product_Group	Quantity	Profit
1	1999	Children	A-Team, Kids	286	4980.15
2	1999	Children	Bathing Suits, Kids	98	1479.95
3	1999	Children	Eclipse, Kid's Clothes	588	9348.95
4	1999	Children	Eclipse, Kid's Shoes	334	7136.80
5	1999	Children	Lucky Guy, Kids	303	7163.00
6	1999	Children	N.D. Gear, Kids	755	19153.05
7	1999	Children	Olssons, Kids	209	1975.35

# Introduction to ODS Graphics

- Graphics generated by default
- Using the SG procedures
- Modifying graphs generated by statistical procedures

# Graphics Generated by Default

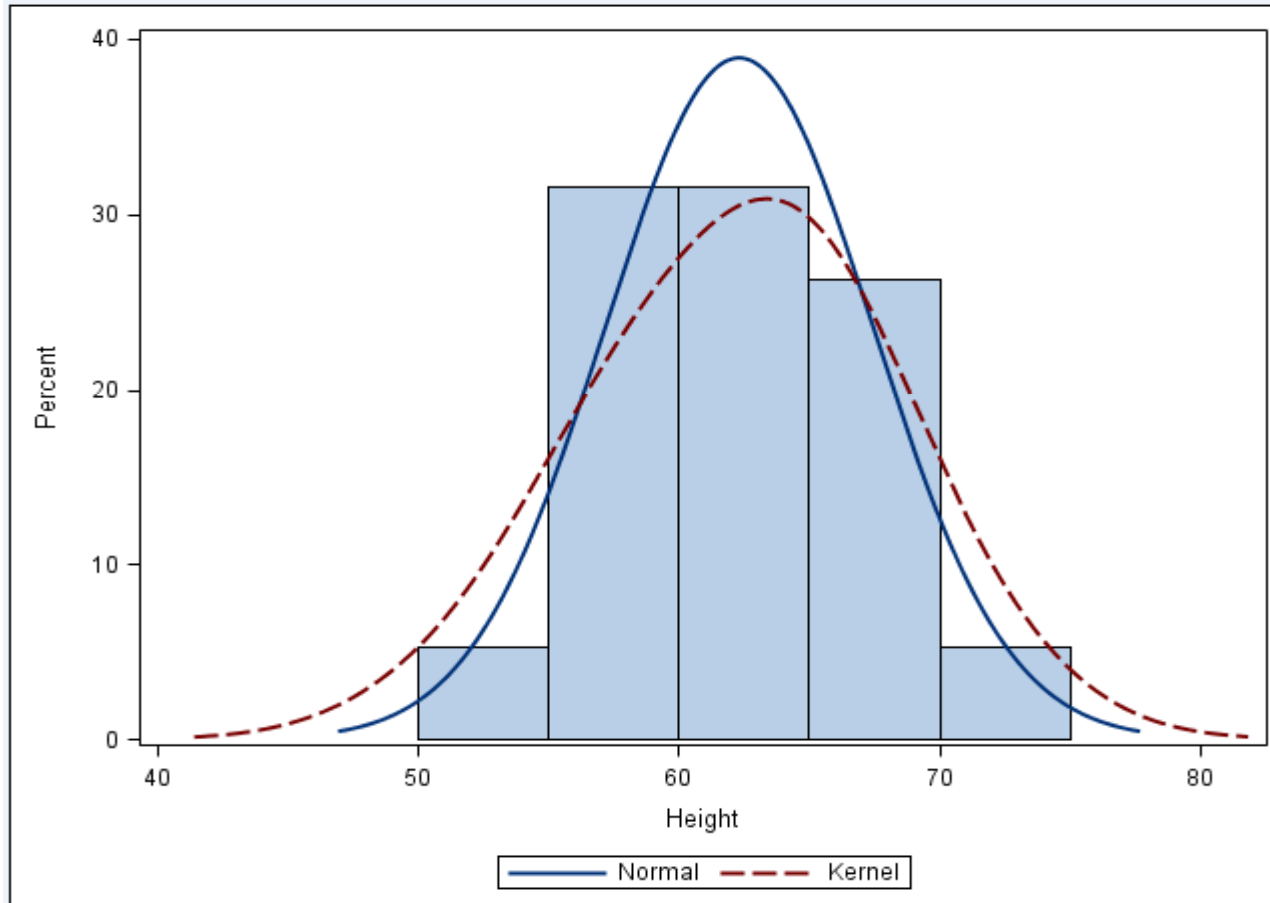
- Statistical procedures create graphs as automatically as they create tables

Base SAS	SAS/STAT			SAS/QC	SAS/ETS
CORR	ANOVA	KDRIGE2D	PRINCOMP	ANOM	ARIMA
FREQ	BOXPLOT	LIFEREG	PRINQUAL	CAPABILITY	AUTOREG
UNIVARIATE	CALIS	LIFETEST	PROBIT	CUSUM	ENTROPY
	CLUSTER	LOESS	QUANTREG	MACONTROL	EXPAND
	CORRESP	LOGISTIC	REG	PARETO	MODEL
	FACTOR	MCMC	ROBUSTREG	RELIABILITY	PANEL
	FREQ	MDS	RSREG	SHEWHART	RISK
	GAM	MI	SEQDESIGN		SIMILARITY
	GENMOD	MIXED	SEQTEST		SYSLIN
	GLIMMIX	MULTTEST	SIM2D		TIMESERIES
	GLM	NPAR1WAY	TCALIS		UCM
	GLMSELECT	PHREG	TRANSREG		VARMAX
	KDE	PLS	TTEST		X12
			VARIOGRAM		

# Using the SG Procedures

```
ods html;  
proc sgplot data=sashelp.class;  
  histogram height;  
  density height;  
  density height / type=kernel;  
run;  
ods html close;
```

# Using the SG Procedures



# New Features in SAS 9.4

- New ODS Destinations for SAS 9.4
- The PROC MSCHART procedure
- PROC ODSTEXT and ODSLISIT
- Enhanced features of the CSS Style Engine
- ODS Layout and the Report Writing Interface

# ODS EXCEL

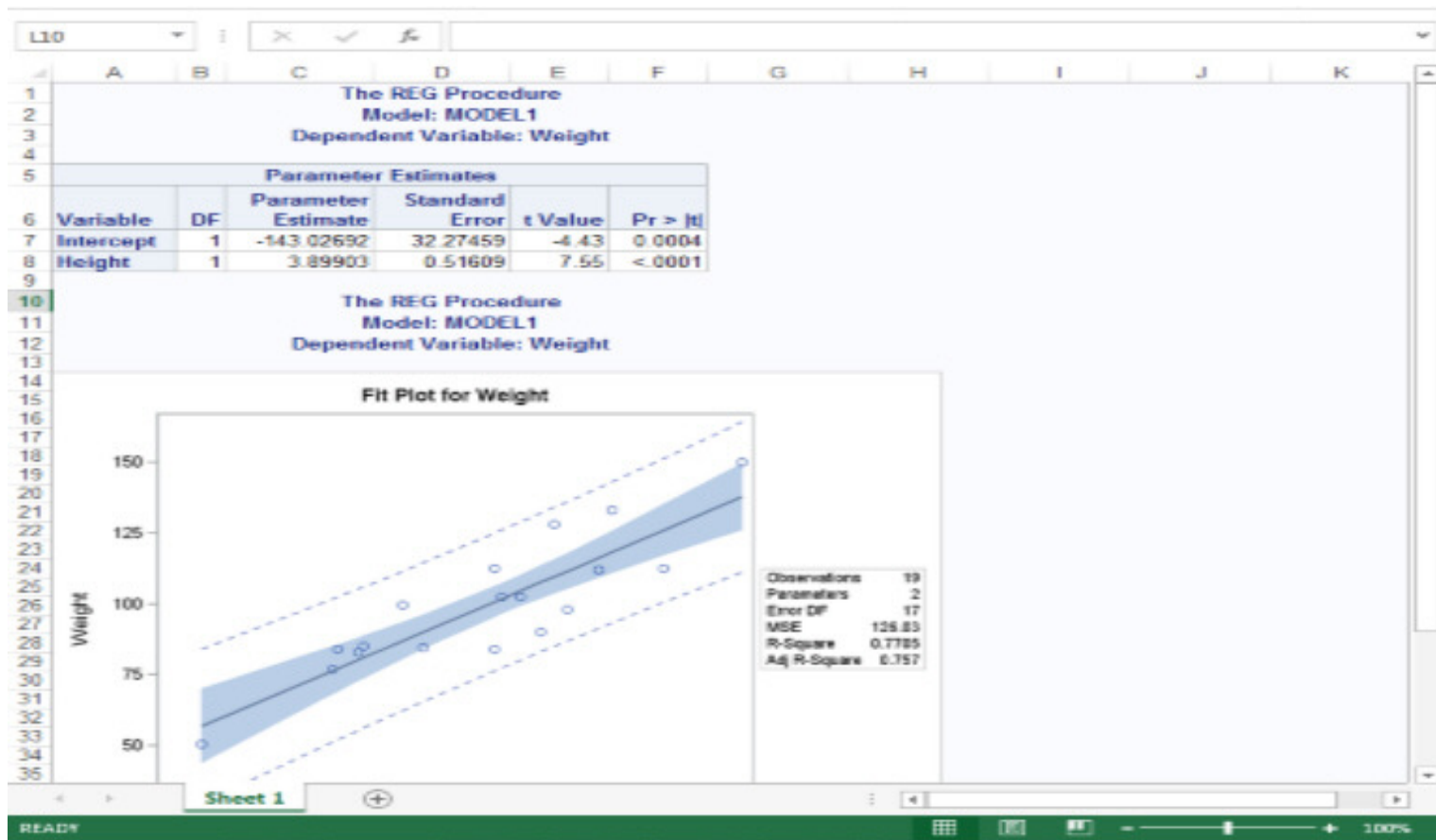
- Office Open XML includes the functionality of a combination of existing tagsets.
- Files sizes are considerably smaller.
- SAS formats are automatically converted to Excel formats
- You can output both graphs and tables.
- Other applications can easily read Office Open XML output.



# ODS Excel - Graphics and Tables

```
ods select fitplot parameterestimates;  
ods excel file="c:\temp.xlsx"  
          options(sheet_interval="none");  
  
proc reg data=sashelp.class;  
  model weight=height;  
run;  
quit;  
  
ods excel close;
```

# ODS Excel - Graphics and Tables



# ODS Excel – Automatic Formatting

```
data one;
  zero=0001;
  dollar_val=123456;
  percent_val=.80;
  comma_val=123456;
  number=12345;
run;

ods excel file="c:\temp.xlsx";
proc print data=one;
  var _numeric_ ;
  var number / style(data)={tagattr="format:[red]#,###"};
  format zero z4. dollar_val dollar6.0 percent_val
           percent5.2 comma_val comma. number 4.;
run;

ods excel close;
```

# ODS Excel – Automatic Formatting

	A	B	C	D	E	F	G	H	I
1	Obs	zero	dollar_val	percent_val	comma_val	number	number		
2	1	0001	\$123,456	80.00%	123,456	12345	12,345		
3									
4									

Table 1 - Data Set WORK.ONE

# ODS Excel – Expanded Options

```
ods excel file="c:\temp.xlsx"  
          options (start_at="B5"  
                  tab_color="red"  
                  absolute_row_height="15"  
                  embedded_titles="yes");  
  
ods text="Sales report for company X";  
proc print data=sashelp.orsales;  
  title "Sample title showing new  
        features";  
run;  
ods excel close;
```

temp - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER POWERPIVOT SAS

Paste Font Alignment Number Styles Cells Editing

J18 : 40049.5

**The SAS System**

Sales report for company X

Obs	Year	Quarter	Product_Line	Product_Category	Product_Group	Quantity	Profit	Total_Retail_Price
1	1999	1999Q1	Children	Children Sports	A-Team, Kids	286	4980.15	8990.90
2	1999	1999Q1	Children	Children Sports	Bathing Suits, Kids	98	1479.95	2560.40
3	1999	1999Q1	Children	Children Sports	Eclipse, Kid's Clothes	588	9348.95	18768.80
4	1999	1999Q1	Children	Children Sports	Eclipse, Kid's Shoes	334	7136.80	14337.20
5	1999	1999Q1	Children	Children Sports	Lucky Guy, Kids	303	7163.00	12996.20
6	1999	1999Q1	Children	Children Sports	N.D. Gear, Kids	755	19153.05	34250.50
7	1999	1999Q1	Children	Children Sports	Olssons, Kids	209	1975.35	3339.30
8	1999	1999Q1	Children	Children Sports	Orion Kid's Clothes	14	288.80	580.40
9	1999	1999Q1	Children	Children Sports	Osprey, Kids	454	7334.70	13219.60
10	1999	1999Q1	Children	Children Sports	Tracker Kid's Clothes	1243	21847.85	40049.50

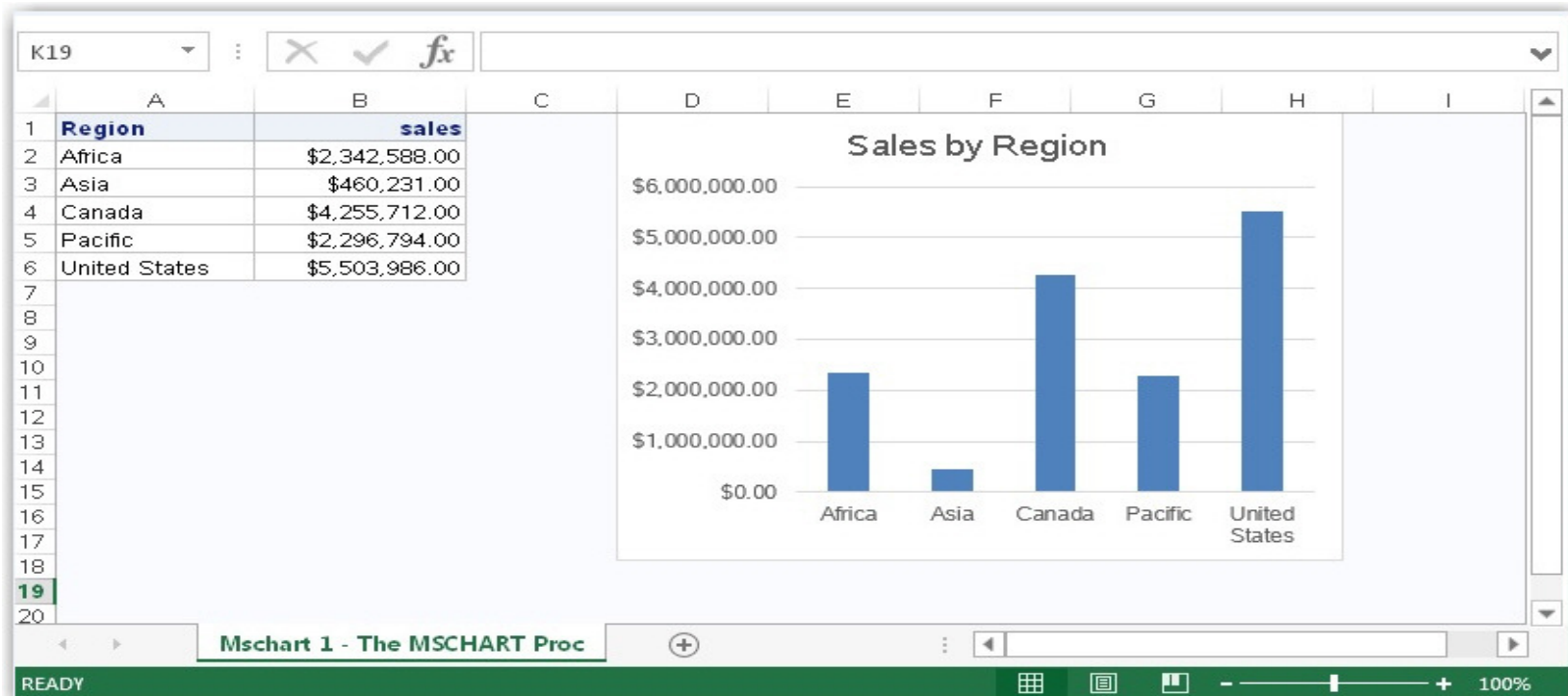
Table 1 - Data Set SASHELP.O

READY 100%

# ODS Excel- PROC MSChart

```
ods excel file="c:\temp.xlsx";  
title "Sales by Region";  
  
proc mschart data=work.shoes category=region width=4in  
            position="$D$1";  
    where region in("Africa","Asia","Canada","Pacific","United  
                    States");  
    vcolumn sales;  
run;  
  
ods excel close;
```

# ODS Excel- PROC MSChart



Generate Native Graphs



# ODS HTML5

- a more robust tagging structure than previous versions of HTML
- the ability to embed video and audio
- inherent drag-and-drop support
- editable content via attributes or scripting
- provides the ability to create embedded SVG files with HTML5
- the ability to create graphics with JavaScript and canvas

# ODS HTML5

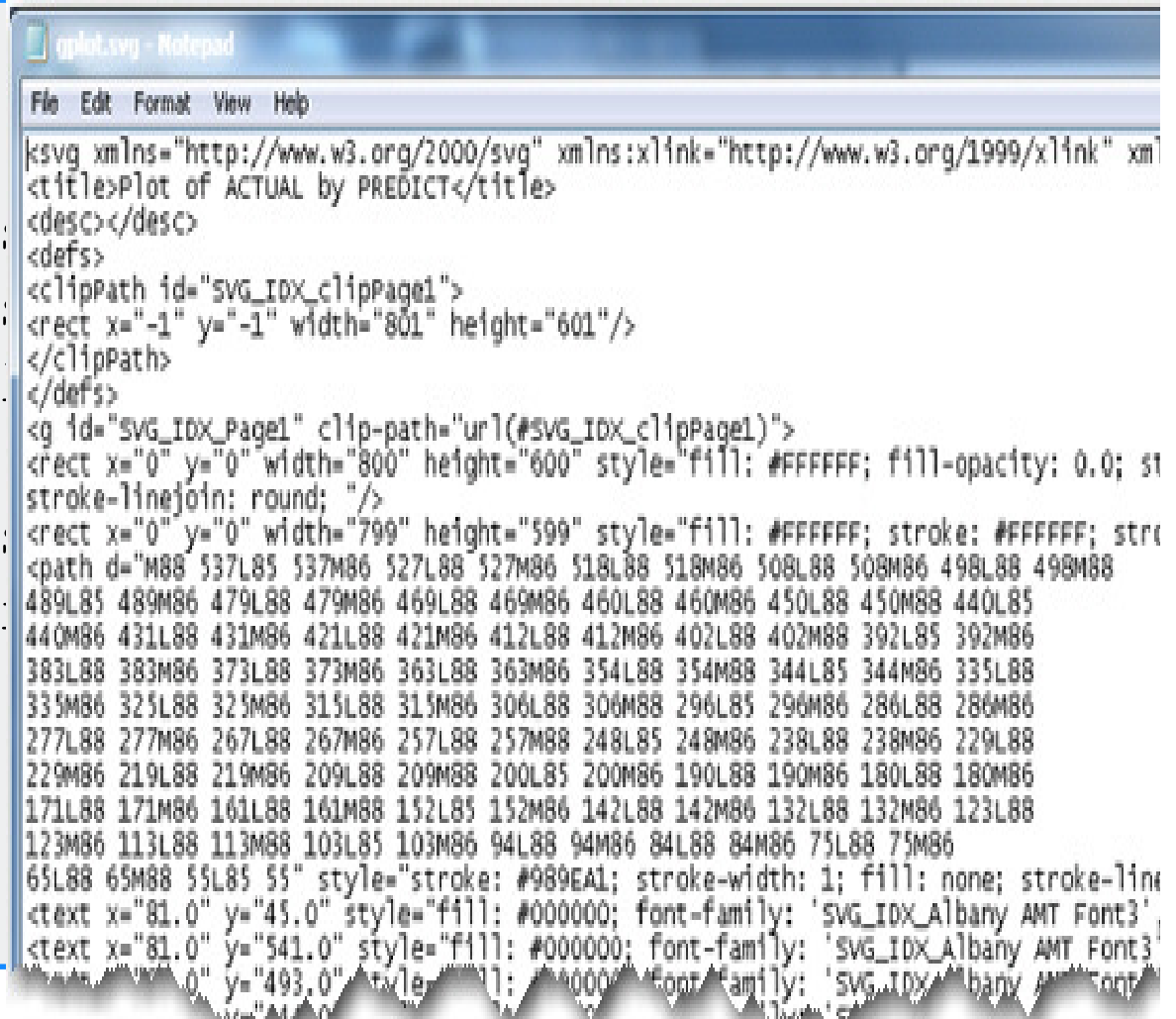
## SVG File

```
goptions device=svg;  
ods html5 options(svg_mode='embed');  
title "Actual sales versus predicted";  
  
proc gplot data=sashelp.prdsale;  
    plot actual*predict;  
run;  
  
quit;  
ods html5 close;
```

# ODS HTML5

## SVG File

```
goptions device=ods html5 option:  
title "Actual sa.  
  
proc gplot data=  
    plot actual*p  
run;  
  
quit;  
ods html5 close;
```



```
gplot.svg - Notepad  
File Edit Format View Help  
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>  
<svg xmlns="http://www.w3.org/2000/svg" xmlns:xlink="http://www.w3.org/1999/xlink" xml  
<title>Plot of ACTUAL by PREDICT</title>  
<desc></desc>  
<defs>  
<clipPath id="SVG_IDX_clipPage1">  
<rect x="-1" y="-1" width="801" height="601"/>  
</clipPath>  
</defs>  
<g id="SVG_IDX_Page1" clip-path="url(#SVG_IDX_clipPage1)">  
<rect x="0" y="0" width="800" height="600" style="fill: #FFFFFF; fill-opacity: 0.0; st  
stroke-linejoin: round; "/>  
<rect x="0" y="0" width="799" height="599" style="fill: #FFFFFF; stroke: #FFFFFF; stro  
<path d="M88 537L85 537M86 527L88 527M86 518L88 518M86 508L88 508M86 498L88 498M88  
489L85 489M86 479L88 479M86 469L88 469M86 460L88 460M86 450L88 450M88 440L85  
440M86 431L88 431M86 421L88 421M86 412L88 412M86 402L88 402M88 392L85 392M86  
383L88 383M86 373L88 373M86 363L88 363M86 354L88 354M88 344L85 344M86 335L88  
335M86 325L88 325M86 315L88 315M86 306L88 306M88 296L85 296M86 286L88 286M86  
277L88 277M86 267L88 267M86 257L88 257M88 248L85 248M86 238L88 238M86 229L88  
229M86 219L88 219M86 209L88 209M88 200L85 200M86 190L88 190M86 180L88 180M86  
171L88 171M86 161L88 161M88 152L85 152M86 142L88 142M86 132L88 132M86 123L88  
123M86 113L88 113M88 103L85 103M86 94L88 94M86 84L88 84M86 75L88 75M86  
65L88 65M88 55L85 55" style="stroke: #989EA1; stroke-width: 1; fill: none; stroke-line  
<text x="81.0" y="45.0" style="fill: #000000; font-family: 'SVG_IDX_Albanys AMT Font3'  
<text x="81.0" y="541.0" style="fill: #000000; font-family: 'SVG_IDX_Albanys AMT Font3'  
<text x="81.0" y="493.0" style="fill: #000000; font-family: 'SVG_IDX_Albanys AMT Font3"
```

# ODS POWERPOINT

```
ods powerpoint file="c:\temp.pptx";
```

```
proc print data=temp;  
title "ODS Powerpoint";  
by age;  
run;
```

```
ods powerpoint close;
```

# ODS POWERPOINT

The screenshot shows a PowerPoint presentation window titled "temp - PowerPoint". The slide content is as follows:

## ODS Powerpoint

Age=11

Obs	Name	Sex	Height	Weight
1	Joyce	F	51.3	50.5
2	Thomas	M	57.5	85.0

Age=12

Obs	Name	Sex	Height	Weight
3	James	M	57.3	83.0
4	Jane	F	59.8	84.5
5	John	M	59.0	99.5
6	Louise	F	56.3	77.0
7	Robert	M	64.8	128.0

6/10/2015 1

Click to add notes

SLIDE 1 OF 3

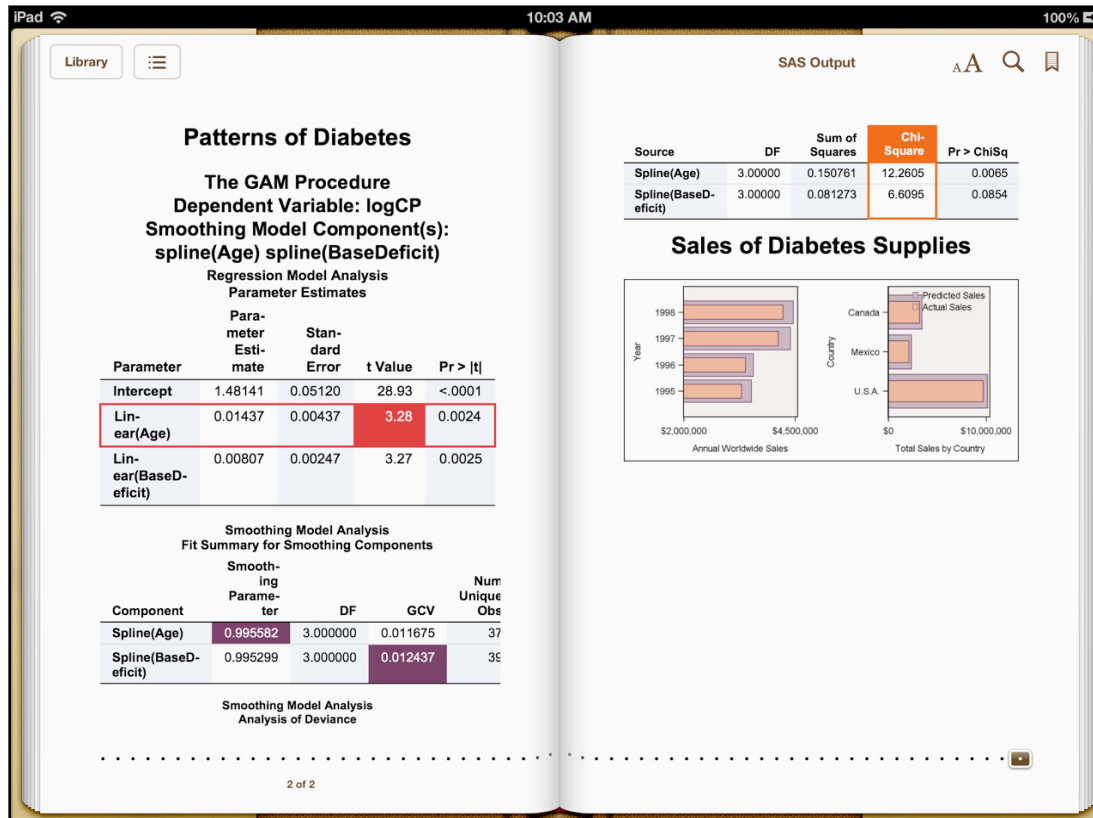
NOTES COMMENTS

72%

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SAS THE POWER TO KNOW.

# ODS EPUB



# Using CSS to Format SAS Output

- SAS 9.2 introduced the ability to use CLASS selectors
- ID and Element selectors were added to the CSS style engine with SAS 9.3
- SAS 9.4 supports the complete CSS library which includes pseudo-classes and attribute classes

# Using CSS to Format SAS Output

```
ods excel file="c:\temp.xlsx" cssstyle="c:\example.css"  
dom;
```

```
proc print data=sashelp.class;  
run;
```

```
ods excel close;
```



# Advanced Selectors:Pseudo-Class Selectors

Pseudo-classes are attached to selectors and selects elements based on element relationships and behaviors.

**Syntax: Selector:Pseudo-class { }**

## Supported Pseudo-Class Selectors

:root	:empty
:first-child	:before
:first-of-type	:after
:nth-child(an+b)	:not
:nth-of-type(n)	

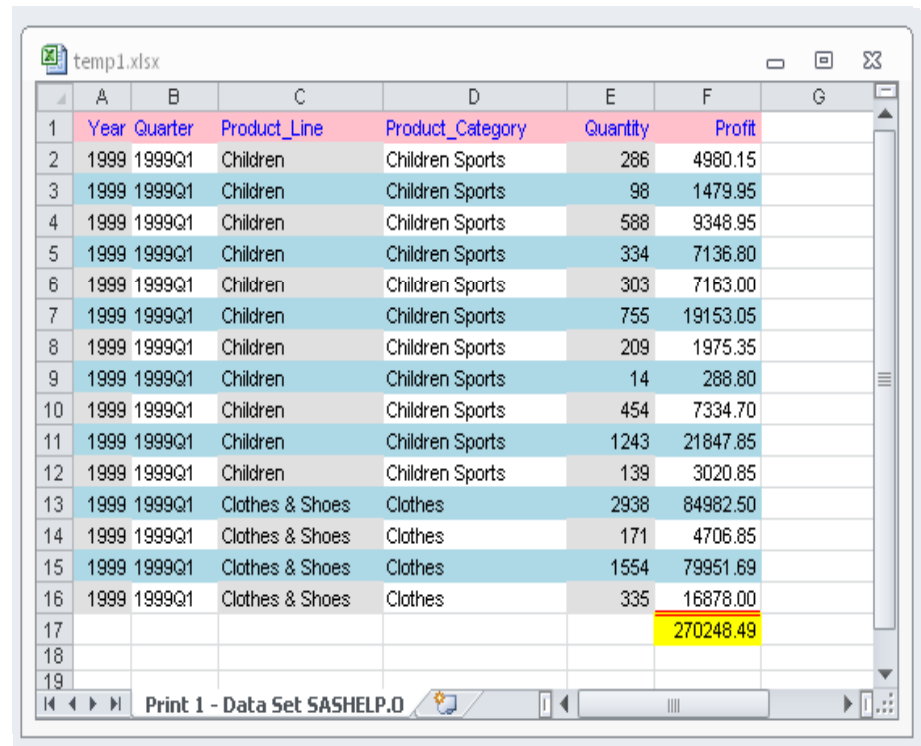
# Advanced Selectors: Internal View

Selector: `tbody tr:nth-child(1) td { }`


```
<thead>
  <tr>
    <th class="header" type="char" index="1" name="name" label="name">Name</th>
    <th class="header" type="char" index="2" name="sex" label="sex">Sex</th>
    <th class="header" type="char" index="3" name="age" label="age">Age</th>
  </tr>
</thead>
<tbody>
  <tr>
    <td class="data" type="char" index="1" name="name" label="name">Joyce</td>
    <td class="data" type="char" index="2" name="sex" label="sex">F</td>
    <td class="data" type="num" index="3" name="age" label="age">11</td>
  </tr>
</tbody>
```

# Advanced Selectors:Pseudo-Class Selectors

```
table thead tr:first-child th {  
    background-color: pink;  
    color: blue;  
}  
table tbody tr:nth-child(even) td {  
    background-color: lightblue;  
}  
table tbody th:nth-of-type(6) {  
    background-color: yellow;  
    border-top: 5px double red;  
}  
table tbody td:nth-child(2n-1) {  
    background-color: #e0e0e0;  
}
```



The screenshot shows an Excel spreadsheet titled 'temp1.xlsx' with the following data:

Year	Quarter	Product_Line	Product_Category	Quantity	Profit
1999	1999Q1	Children	Children Sports	286	4980.15
1999	1999Q1	Children	Children Sports	98	1479.95
1999	1999Q1	Children	Children Sports	588	9348.95
1999	1999Q1	Children	Children Sports	334	7136.80
1999	1999Q1	Children	Children Sports	303	7163.00
1999	1999Q1	Children	Children Sports	755	19153.05
1999	1999Q1	Children	Children Sports	209	1975.35
1999	1999Q1	Children	Children Sports	14	288.80
1999	1999Q1	Children	Children Sports	454	7334.70
1999	1999Q1	Children	Children Sports	1243	21847.85
1999	1999Q1	Children	Children Sports	139	3020.85
1999	1999Q1	Clothes & Shoes	Clothes	2938	84982.50
1999	1999Q1	Clothes & Shoes	Clothes	171	4706.85
1999	1999Q1	Clothes & Shoes	Clothes	1554	79951.69
1999	1999Q1	Clothes & Shoes	Clothes	335	16878.00
					270248.49

# ODS Layout-Absolute

```
ods layout start width=8in height=10in;
```

```
ods region x=0in y=0in width=6in;  
Ods text="{preimage='sas.png'}";
```

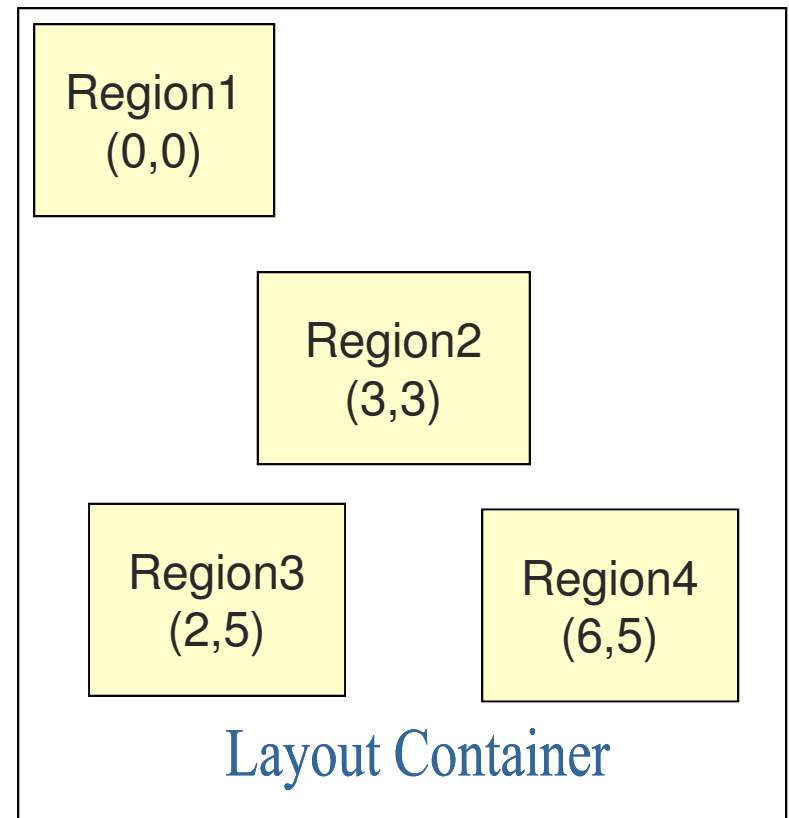
```
ods region x=3in y=3in width=4in;  
proc print data=sashelp.prdsale;  
run;
```

```
ods region x=2in y=5in width=4in;  
proc means data=sashelp.prdsale sum;  
Class country  
run;
```

```
ods region x=6in y=5in width=4in;  
proc sgplot data=sashelp.prdsale  
vbar country / reponse=actual;  
vbar country / reponse=predicted;  
run;  
ods layout end;
```

Y

X



# ODS Layout-Absolute

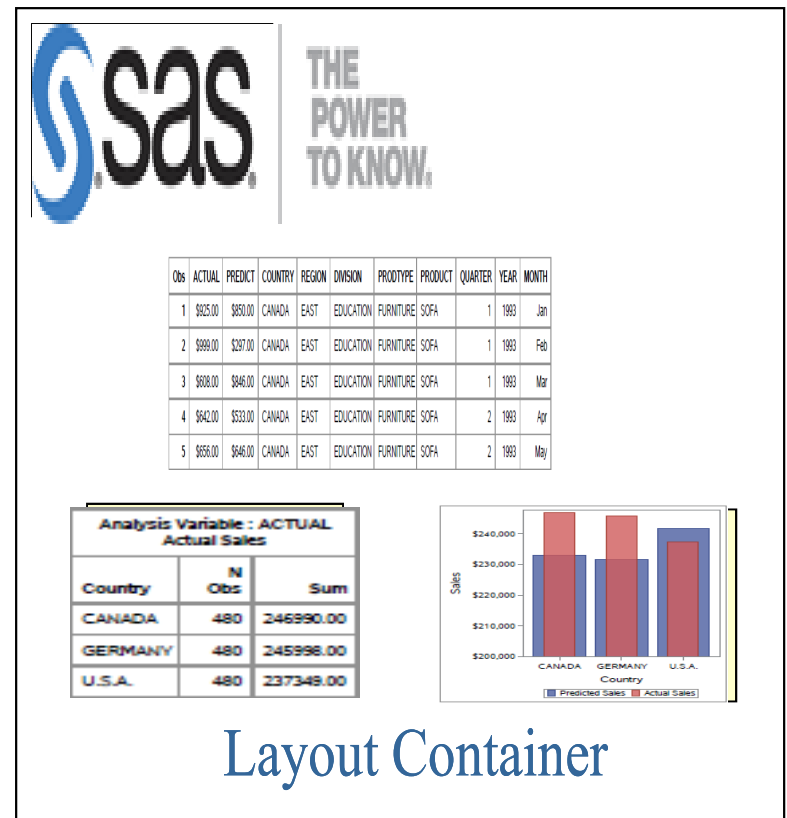
```
ods layout start width=8in height=10in;
```

```
ods region x=0in y=0in width=6in;  
Ods text="{preimage='sas.png'}";
```

```
ods region x=3in y=3in width=4in;  
proc print data=sashelp.prdsale;  
run;
```

```
ods region x=2in y=5in width=4in;  
proc means data=sashelp.prdsale sum;  
Class country  
run;
```

```
ods region x=6in y=5in width=4in;  
proc sgplot data=sashelp.prdsale  
vbar country / reponse=actual;  
vbar country / reponse=predicted;  
run;  
ods layout end;
```



# ODS Layout-Absolute

ODS Layout and  
PROC ODSTEXT

## WOMEN AND SMOKING



**This fact sheet is for public health professionals who are interested in information on how smoking affects women's health. Today, women smokers are as likely as men who smoke to suffer from many serious diseases and from early death caused by smoking.**

In the last 50 years, a woman's risk of dying from smoking has more than tripled and is now equal to men's risk. The United States has more than 20 million women and girls who currently smoke cigarettes. Smoking puts them at risk for:

- heart attacks;
- strokes;
- lung cancer;
- emphysema; and
- other serious chronic illnesses such as diabetes.

More than 170,000 American women die of diseases caused by smoking each year, with additional deaths coming from the use of other tobacco products such as smokeless tobacco.

### A TARGET MARKET

When the first Surgeon General's Report on smoking was released in 1964, it caused a rapid drop in smoking among men. Yet smoking rates among women continued to go up in the years immediately following the report as tobacco companies aggressively marketed to women. Documents from the tobacco industry show that cigarette companies created a line of slimmer cigarettes packaged in pastel colors to appeal to women, and implied that smoking could keep girls and women thin. They also used slogans, advertising, and sports sponsorships to tie their products to the women's rights movement throughout the 1960s and 1970s.

The women most likely to smoke today are among the most vulnerable—those disadvantaged by low income, less education, and mental health disorders. Women in these groups are also less likely to quit smoking when they become pregnant and are more likely to start smoking again after delivery. This worsens the dangerous health effects from smoking on mothers and their children.

### DISEASE AND WOMEN SMOKERS

Many of the findings in the 2014 Surgeon General's Report are especially important for women who smoke. Between 1959 and 2010, lung cancer risk for smokers rose dramatically. While men's risk doubled, the risk among female smokers increased nearly ten-fold. Today, more women die from lung cancer than breast cancer.

### RESPIRATORY DISEASES

Chronic obstructive pulmonary disease (COPD) includes emphysema, chronic bronchitis, and other conditions that damage airways. People with the disease suffer from shortness of breath and lack of oxygen that worsens over time. COPD has no cure. Nearly 9 out of 10 cases of COPD are caused by smoking. Women smokers in certain age groups are up to 38 times more likely to develop COPD than women who have never smoked. More women than men are now dying every year from COPD, and women appear more susceptible to developing severe COPD at younger ages.

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# Conclusion

The ability to generate dynamic reports have never been easier with all of the tools of the Output Delivery System.

# Contact

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