

SAS[®] 101

Based on

Learning SAS by Example:

A Programmer's Guide

Chapters 14 & 19

By Tasha Chapman, Oregon Health Authority

Topics covered...

- Displaying your data
 - PROC Print
 - PROC Sort
- Global statements
 - Titles
 - Footnotes
 - System options

Topics covered...

- Output Delivery System (ODS)
 - ODS PDF, ODS RTF, ODS HTML
 - Styles
 - ODS Escapechar
 - Excel XP Tagset
 - ODS Select/Exclude
 - ODS Output

A horizontal bar at the top of the slide, divided into an orange section on the left and a blue section on the right. The text "Displaying your data" is written in white on the blue section.

Displaying your data

PROC Print

- PROC Print can be used to list the data in a SAS dataset

```
data demographics;
infile datalines;
input Gender $ Age Height Weight;
datalines;
M 50 68 155
F 23 60 101
M 65 72 220
F 35 65 133
M 15 71 166
;

proc print; run;
```

PROC Print

| | | The SAS System | | 13:41 Wednesd. |
|-----|--------|----------------|--------|----------------|
| Obs | Gender | Age | Height | Weight |
| 1 | M | 50 | 68 | 155 |
| 2 | F | 23 | 60 | 101 |
| 3 | M | 65 | 72 | 220 |
| 4 | F | 35 | 65 | 133 |
| 5 | M | 15 | 71 | 166 |

Results of PROC Print of “Demographics”

PROC Print

- Many options to control output of PROC Print
 - `noobs` – Suppresses “OBS” column in output
 - (`obs=2`) – Only prints the first two observations
 - Can put in any number: 1 through N
 - Must be placed in parentheses after `data=` option
 - `var` statement – Only prints listed variables

```
proc print noobs data=demographics(obs=2);  
var Gender Height;  
run;
```

The SAS System 09:

Gender Height

| | |
|---|----|
| M | 68 |
| F | 60 |

PROC Print

- `where` statement – Only print selected observations
- `format` statement – Apply format to selected variables
 - Only applies to current procedure
- `label` statement – Assign column headers
 - Only applies for current procedure
 - Must use `label` option, even if `label` statement is present

```
proc print data=demographics label noobs;  
  where Gender = 'M';  
  format Gender $gender.;  
  var Gender Height;  
  label Gender = 'Gender of student'  
         Height = 'Height in inches';  
run;
```

| The SAS System | | 09:3 |
|-------------------------|------------------------|------|
| Gender of student | Height in inches | |
| Male | 68 | |
| Male | 72 | |
| Male | 71 | |



We interrupt this message for...

PROC Sort

PROC Sort

```
libname in'D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Data\SAS Datasets';
```

```
data sales; set in.sales;  
run;
```

```
proc print data=sales;  
run;
```

The SAS System

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| Obs | Emp ID | Name | Region | Customer | Item | Quantity | UnitCost | Total Sales |
|-----|--------|----------------|--------|-------------------|-------|----------|----------|-------------|
| 1 | 1843 | George Smith | North | Barco Corporation | 144L | 50 | 8.99 | 449.5 |
| 2 | 1843 | George Smith | South | Cost Cutter's | 122 | 100 | 5.99 | 599.0 |
| 3 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 4 | 1843 | George Smith | North | Barco Corporation | 908X | 1 | 5129.00 | 5129.0 |
| 5 | 1843 | George Smith | South | Ely Corp. | 122L | 10 | 29.95 | 299.5 |
| 6 | 0177 | Glenda Johnson | East | Food Unlimited | 188X | 100 | 6.99 | 699.0 |
| 7 | 0177 | Glenda Johnson | East | Shop and Drop | 144L | 100 | 8.99 | 899.0 |
| 8 | 1843 | George Smith | South | Cost Cutter's | 855W | 1 | 9109.00 | 9109.0 |
| 9 | 9888 | Sharon Lu | West | Cost Cutter's | 122 | 50 | 5.99 | 299.5 |
| 10 | 9888 | Sharon Lu | West | Pet's are Us | 100W | 1000 | 1.99 | 1990.0 |
| 11 | 0017 | Jason Nguyen | East | Roger's Spirits | 122L | 500 | 39.99 | 19995.0 |
| 12 | 0017 | Jason Nguyen | South | Spirited Spirits | 407XX | 100 | 19.95 | 1995.0 |
| 13 | 0177 | Glenda Johnson | North | Minimart Inc. | 777 | 5 | 10.50 | 52.5 |
| 14 | 0177 | Glenda Johnson | East | Barco Corporation | 733 | 2 | 10000.00 | 20000.0 |
| 15 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |

PROC Sort

```
proc sort data=sales; by TotalSales; run;  
  
proc print data=sales; run;
```

The SAS System 09:38 Thursday, January 10, 2013

| Obs | Emp ID | Name | Region | Customer | Item | Quantity | UnitCost | Total Sales |
|-----|--------|----------------|--------|-------------------|-------|----------|----------|-------------|
| 1 | 0177 | Glenda Johnson | North | Minimart Inc. | 777 | 5 | 10.50 | 52.5 |
| 2 | 1843 | George Smith | South | Ely Corp. | 122L | 10 | 29.95 | 299.5 |
| 3 | 9888 | Sharon Lu | West | Cost Cutter's | 122 | 50 | 5.99 | 299.5 |
| 4 | 1843 | George Smith | North | Barco Corporation | 144L | 50 | 8.99 | 449.5 |
| 5 | 1843 | George Smith | South | Cost Cutter's | 122 | 100 | 5.99 | 599.0 |
| 6 | 0177 | Glenda Johnson | East | Food Unlimited | 188X | 100 | 6.99 | 699.0 |
| 7 | 0177 | Glenda Johnson | East | Shop and Drop | 144L | 100 | 8.99 | 899.0 |
| 8 | 9888 | Sharon Lu | West | Pet's are Us | 100W | 1000 | 1.99 | 1990.0 |
| 9 | 0017 | Jason Nguyen | South | Spirited Spirits | 407XX | 100 | 19.95 | 1995.0 |
| 10 | 1843 | George Smith | North | Barco Corporation | 908X | 1 | 5129.00 | 5129.0 |
| 11 | 1843 | George Smith | South | Cost Cutter's | 855W | 1 | 9109.00 | 9109.0 |
| 12 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 13 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 14 | 0017 | Jason Nguyen | East | Roger's Spirits | 122L | 500 | 39.99 | 19995.0 |
| 15 | 0177 | Glenda Johnson | East | Barco Corporation | 733 | 2 | 10000.00 | 20000.0 |

A

Z

PROC Sort

```
proc sort data=sales; by descending TotalSales; run;  
proc print data=sales; run;
```

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| Obs | Emp ID | Name | Region | Customer | Item | Quantity | UnitCost | Total Sales |
|-----|--------|----------------|--------|-------------------|-------|----------|----------|-------------|
| 1 | 0177 | Glenda Johnson | East | Barco Corporation | 733 | 2 | 10000.00 | 20000.0 |
| 2 | 0017 | Jason Nguyen | East | Roger's Spirits | 122L | 500 | 39.99 | 19995.0 |
| 3 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 4 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 5 | 1843 | George Smith | South | Cost Cutter's | 855W | 1 | 9109.00 | 9109.0 |
| 6 | 1843 | George Smith | North | Barco Corporation | 908X | 1 | 5129.00 | 5129.0 |
| 7 | 0017 | Jason Nguyen | South | Spirited Spirits | 407XX | 100 | 19.95 | 1995.0 |
| 8 | 9888 | Sharon Lu | West | Pet's are Us | 100W | 1000 | 1.99 | 1990.0 |
| 9 | 0177 | Glenda Johnson | East | Shop and Drop | 144L | 100 | 8.99 | 899.0 |
| 10 | 0177 | Glenda Johnson | East | Food Unlimited | 188X | 100 | 6.99 | 699.0 |
| 11 | 1843 | George Smith | South | Cost Cutter's | 122 | 100 | 5.99 | 599.0 |
| 12 | 1843 | George Smith | North | Barco Corporation | 144L | 50 | 8.99 | 449.5 |
| 13 | 1843 | George Smith | South | Ely Corp. | 122L | 10 | 29.95 | 299.5 |
| 14 | 9888 | Sharon Lu | West | Cost Cutter's | 122 | 50 | 5.99 | 299.5 |
| 15 | 0177 | Glenda Johnson | North | Minimart Inc. | 777 | 5 | 10.50 | 52.5 |



PROC Sort

```
proc sort data=sales by Region descending TotalSales; run;  
proc print data=sales; run;
```

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| Obs | Emp ID | Name | Region | Customer | Item | Quantity | UnitCost | Total Sales |
|-----|--------|----------------|--------|-------------------|-------|----------|----------|-------------|
| 1 | 0177 | Glenda Johnson | East | Barco Corporation | 733 | 2 | 10000.00 | 20000.0 |
| 2 | 0017 | Jason Nguyen | East | Roger's Spirits | 122L | 500 | 39.99 | 19995.0 |
| 3 | 0177 | Glenda Johnson | East | Shop and Drop | 144L | 100 | 8.99 | 899.0 |
| 4 | 0177 | Glenda Johnson | East | Food Unlimited | 188X | 100 | 6.99 | 699.0 |
| 5 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 6 | 1843 | George Smith | North | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 7 | 1843 | George Smith | North | Barco Corporation | 908X | 1 | 5129.00 | 5129.0 |
| 8 | 1843 | George Smith | North | Barco Corporation | 144L | 50 | 8.99 | 449.5 |
| 9 | 0177 | Glenda Johnson | North | Minimart Inc. | 777 | 5 | 10.50 | 52.5 |
| 10 | 1843 | George Smith | South | Cost Cutter's | 855W | 1 | 9109.00 | 9109.0 |
| 11 | 0017 | Jason Nguyen | South | Spirited Spirits | 407XX | 100 | 19.95 | 1995.0 |
| 12 | 1843 | George Smith | South | Cost Cutter's | 122 | 100 | 5.99 | 599.0 |
| 13 | 1843 | George Smith | South | Ely Corp. | 122L | 10 | 29.95 | 299.5 |
| 14 | 9888 | Sharon Lu | West | Pet's are Us | 100W | 1000 | 1.99 | 1990.0 |
| 15 | 9888 | Sharon Lu | West | Cost Cutter's | 122 | 50 | 5.99 | 299.5 |





Now back to...

PROC Print

PROC Print

- `id` statement – Assigns an observation ID based on listed variable (instead of OBS number)
- `by` statement – Produces a separate section of the report for each BY group
- `pageby` statement – Creates a page break after each BY group (not shown)
 - Must use be used with **BY** statement

```
□ proc sort data=sales; by Region descending TotalSales; run;  
  
□ proc print data=sales;  
  id empid;  
  by region;  
run;
```

PROC Print

The SAS System

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----- Region=East -----

| Emp ID | Name | Customer | Item | Quantity | UnitCost | Total Sales |
|--------|----------------|-------------------|------|----------|----------|-------------|
| 0177 | Glenda Johnson | Barco Corporation | 733 | 2 | 10000.00 | 20000 |
| 0017 | Jason Nguyen | Roger's Spirits | 122L | 500 | 39.99 | 19995 |
| 0177 | Glenda Johnson | Shop and Drop | 144L | 100 | 8.99 | 899 |
| 0177 | Glenda Johnson | Food Unlimited | 188X | 100 | 6.99 | 699 |

----- Region=North -----

| Emp ID | Name | Customer | Item | Quantity | UnitCost | Total Sales |
|--------|----------------|-------------------|------|----------|----------|-------------|
| 1843 | George Smith | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 1843 | George Smith | Minimart Inc. | 188S | 3 | 5199.00 | 15597.0 |
| 1843 | George Smith | Barco Corporation | 908X | 1 | 5129.00 | 5129.0 |
| 1843 | George Smith | Barco Corporation | 144L | 50 | 8.99 | 449.5 |
| 0177 | Glenda Johnson | Minimart Inc. | 777 | 5 | 10.50 | 52.5 |

----- Region=South -----

| Emp ID | Name | Customer | Item | Quantity | UnitCost | Total Sales |
|--------|--------------|------------------|-------|----------|----------|-------------|
| 1843 | George Smith | Cost Cutter's | 855W | 1 | 9109.00 | 9109.0 |
| 0017 | Jason Nguyen | Spirited Spirits | 407XX | 100 | 19.95 | 1995.0 |
| 1843 | George Smith | Cost Cutter's | 122 | 100 | 5.99 | 599.0 |
| 1843 | George Smith | Ely Corp. | 122L | 10 | 29.95 | 299.5 |

----- Region=West -----

| Emp ID | Name | Customer | Item | Quantity | UnitCost | Total Sales |
|--------|-----------|---------------|------|----------|----------|-------------|
| 9888 | Sharon Lu | Pet's are Us | 100W | 1000 | 1.99 | 1990.0 |
| 9888 | Sharon Lu | Cost Cutter's | 122 | 50 | 5.99 | 299.5 |

PROC Print

- `sumby` statement – Calculates a sum for each BY group and total sum
 - Must use be used with `BY` statement
- `sum` statement – selects which variables to sum
 - If excluded, all numeric variables are summed

```
□ proc sort data=sales; by Region descending TotalSales; run;  
  
□ proc print data=sales;  
  id empid;  
  by region;  
  sumby region;  
  sum totalsales;  
run;
```

PROC Print

```
----- Region=South -----  
  
EmpID      Name      Customer      Item      Quantity      UnitCost      Total  
Sales  
1843      George Smith      Cost Cutter's      855W      1      9109.00      9109.0  
0017      Jason Nguyen      Spirited Spirits      407XX      100      19.95      1995.0  
1843      George Smith      Cost Cutter's      122      100      5.99      599.0  
1843      George Smith      Ely Corp.      122L      10      29.95      299.5  
-----  
Region  
-----  
12002.5
```

```
----- Region=West -----  
  
EmpID      Name      Customer      Item      Quantity      UnitCost      Total  
Sales  
9888      Sharon Lu      Pet's are Us      100W      1000      1.99      1990.0  
9888      Sharon Lu      Cost Cutter's      122      50      5.99      299.5  
-----  
Region  
-----  
2289.5  
-----  
92710.0
```

PROC Print

- Every PROC and DATA step with **BY** statement must use dataset sorted by BY variable
 - Use **descending** option if sorted in descending order

```
proc sort data=sales; by descending Region; run;  
proc print data=sales noobs;  
by descending region; ←  
var customer region totalsales;  
run;
```

| ----- Region=West ----- | | |
|-------------------------|--------|-------------|
| Customer | Region | Total Sales |
| Cost Cutter's | West | 299.5 |
| Pet's are Us | West | 1990.0 |

| ----- Region=South ----- | | |
|--------------------------|--------|-------------|
| Customer | Region | Total Sales |
| Ely Corp. | South | 299.5 |
| Cost Cutter's | South | 599.0 |
| Spirited Spirits | South | 1995.0 |
| Cost Cutter's | South | 9109.0 |

| ----- Region=North ----- | | |
|--------------------------|--------|-------------|
| Customer | Region | Total Sales |
| Minimart Inc. | North | 52.5 |

PROC Print

- Every PROC and DATA step with **BY** statement must use dataset sorted by BY variable
 - Use **notsorted** option if prefer data be sorted by some other variable

```
proc sort data=sales; by totalsales; run;
proc print data=sales noobs;
  by region notsorted;
  var customer region totalsales;
run;
```

| ----- Region=South ----- | | |
|--------------------------|--------|-------------|
| Customer | Region | Total Sales |
| Ely Corp. | South | 299.5 |

| ----- Region=North ----- | | |
|--------------------------|--------|-------------|
| Customer | Region | Total Sales |
| Barco Corporation | North | 449.5 |

| ----- Region=South ----- | | |
|--------------------------|--------|-------------|
| Customer | Region | Total Sales |
| Cost Cutter's | South | 599 |

| ----- Region=East ----- | | |
|-------------------------|--------|-------------|
| Customer | Region | Total Sales |

PROC Print

- PROC Print useful for providing quick list of data
- SAS 9.3 includes new options for PROC Print
 - ▣ (see linked paper)
- Other reporting procedures (PROC Report, PROC Tabulate) usually better for more complex reports
 - ▣ We'll discuss these in later chapters





Global statements

Titles, footnotes, options

```
* SAS program to read veggie data file and to produce several reports;
options nocenter nonumber;
data veg;
  infile 'D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Data\Text a
  input Name $ Code $ Days Number Price;
  CostPerSeed = Price / Number;
run;
title 'List of the Raw Data';
proc print data=veg;
run;

title 'Frequency Distribution of Vegetable Names';
proc freq data=veg;
run;

title 'Frequency Distribution of Vegetable Names';
proc freq data=veg;
run;
```

Global statements:
Remain in effect until changed by another global statement or SAS session ends

Examples:
Titles, Footnotes, Options, Macros, Libname

WARNING: File command CANCELLED

C:\Documents and Settings\or0167377 Ln 1, Col 1

Titles and footnotes

- Can have up to ten title lines and ten footnote lines
- Titles and footnotes will appear on the top and bottom of every page

```
title1 "The XYZ Company";
title3 "Fiscal year 2006";
title4 "Prepared by Roger Rabbit";
footnote "All sales figures are confidential";

proc print data=sales label sumlabel="Shipments: ' 'Total shipments: ' ";
  id empid;
  by region;
  sumby region;
  sum totalsales;
  format totalsales unitcost dollar12.2 quantity comma6.;
  label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'
        item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';
run;
```

Titles and footnotes

The XYZ Company
Fiscal year 2006
Prepared by Roger Rabbit

----- Sales Region=East -----

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|-------------------|---------|----------|-------------|-------------|
| 0177 | Glenda Johnson | Barco Corporation | 733 | 2 | \$10,000.00 | \$20,000.00 |
| 0017 | Jason Nguyen | Roger's Spirits | 122L | 500 | \$39.99 | \$19,995.00 |
| 0177 | Glenda Johnson | Shop and Drop | 144L | 100 | \$8.99 | \$899.00 |
| 0177 | Glenda Johnson | Food Unlimited | 188X | 100 | \$6.99 | \$699.00 |
| ----- | | | | | | \$41,593.00 |
| Sales Region | | | | | | |

Shipments: 4

----- Sales Region=North -----

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|---------------|---------------|---------|----------|-----------|-------------|
| 1843 | George Smith | Lost Letter's | 122 | 100 | \$5.99 | \$599.00 |
| 1843 | George Smith | Ely Corp. | 122L | 10 | \$29.95 | \$299.50 |
| ----- | | | | | | \$12,002.50 |
| Sales Region | | | | | | |

Shipments: 4

All sales figures are confidential

Titles and footnotes

- Titles and footnotes remain in effect until overwritten by another title/footnote or until SAS session ends
- Submitting a new `titleN` statement will replace `titleN`, plus all title lines below it (same for footnotes)
 - Will not affect lines above it
- To cancel all titles and/or footnotes:

```
title;  
  
footnote;
```

Titles and footnotes

```
title1 "The XYZ Company";  
title3 "Fiscal year 2006";  
title4 "Prepared by Roger Rabbit";  
title5 "Sales to Minimart Inc.";  
footnote "All sales figures are confidential";
```

```
proc print data=sales label sumlabel n='Shipments: ' 'Total shipments: '  
  where upcase(customer) = 'MINIMART INC.';  
  id empid;  
  by region;  
  sumby region;  
  sum totalsales;  
  format totalsales unitcost dollar12.2 quantity comma6.;  
  label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'  
        item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';  
run;
```

```
title5 "Sales to Barco Corporation";
```

```
proc print data=sales label sumlabel n='Shipments: ' 'Total shipments: '  
  where upcase(customer) = 'BARCO CORPORATION';  
  id empid;  
  by region;  
  sumby region;  
  sum totalsales;  
  format totalsales unitcost dollar12.2 quantity comma6.;  
  label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'  
        item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';  
run;
```

Titles and footnotes

The XYZ Company 09:48 Tuesday, January 15, 2013 24

Fiscal year 2006
Prepared by Roger Rabbit
Sales to Minimart Inc.

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|---------------|---------|----------|------------|-------------|
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 0177 | Glenda Johnson | Minimart Inc. | 777 | 5 | \$10.50 | \$52.50 |
| ----- | | | | | | \$31,246.50 |
| Sales Region | | | | | | ----- |
| | | | | | | \$31,246.50 |

The XYZ Company 09:48 Tuesday, January 15, 2013 25

Fiscal year 2006
Prepared by Roger Rabbit
Sales to Barco Corporation

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------------------------|----------------|-------------------|---------|----------|-------------|-------------|
| 0177 | Glenda Johnson | Barco Corporation | 733 | 2 | \$10,000.00 | \$20,000.00 |
| Shipments: 1 | | | | | | |
| ----- Sales Region=North ----- | | | | | | |
| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
| 1843 | George Smith | Barco Corporation | 908X | 1 | \$5,129.00 | \$5,129.00 |
| 1843 | George Smith | Barco Corporation | 144L | 50 | \$8.99 | \$449.50 |
| ----- | | | | | | \$5,578.50 |
| Sales Region | | | | | | ----- |
| | | | | | | \$25,578.50 |
| Shipments: 2 | | | | | | |
| Total shipments: 3 | | | | | | |

System options

- System options are instructions that affect your SAS session
- System options remain in effect until changed by another option statement or until SAS session ends
- Some options affecting appearance of output will be overridden by the Output Delivery System (ODS)
 - ▣ ODS will be discussed in later slides

Examples of system options

SAS Documentation

Common system options

OPTIONS *option(s)*;

| Option | Purpose | Default |
|--------------------------|---|-----------------|
| date nodate | Specifies whether to print the system date/time on the output | date |
| number nonumber | Specifies whether to print the page number on the output | number |
| orientation= | Specifies the paper orientation to use for the output | portrait |
| yearcutoff= | Specifies the first year of the 100-year span for reading two-digit years | 1920 |



Output Delivery System (ODS)

Output Delivery System (ODS)

- ODS allows output from procedures to be presented in multiple formats
 - PDF
 - Excel
 - HTML
 - Word
 - Etc.

Output Delivery System (ODS)

- Many advantages of ODS:
 - Output can be opened in non-SAS applications
 - More control over the appearance of the output
 - Can send output to multiple destinations at once

Output Delivery System (ODS)

- ❑ ODS code is sandwiched around your output producing SAS code
- ❑ Anything produced within the ODS sandwich is output to the selected destination



```
ods pdf file='D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\First ODS.pdf';
```

```
proc sort data=sales; by Region descending TotalSales; run;
```

```
proc print data=sales label sumlabel n='Shipments: ' 'Total shipments: ';  
id empid;  
by region;  
sumby region;  
sum totalsales;  
format totalsales unitcost dollar12.2 quantity comma6.;  
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'  
item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';  
run;
```



```
ods pdf close;
```

Output Delivery System (ODS)

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Sales Region=East

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|-------------------|---------|----------|-------------|-------------|
| 0177 | Glenda Johnson | Barco Corporation | 733 | 2 | \$10,000.00 | \$20,000.00 |
| 0017 | Jason Nguyen | Roger's Spirits | 122L | 500 | \$39.99 | \$19,995.00 |
| 0177 | Glenda Johnson | Shop and Drop | 144L | 100 | \$8.99 | \$899.00 |
| 0177 | Glenda Johnson | Food Unlimited | 188X | 100 | \$6.99 | \$699.00 |
| Sales Region | | | | | | \$41,593.00 |

Shipments: 4

Sales Region=North

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|-------------------|---------|----------|------------|-------------|
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,190.00 | \$15,570.00 |
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,190.00 | \$15,570.00 |
| 1843 | George Smith | Barco Corporation | 908X | 1 | \$5,120.00 | \$5,120.00 |
| 1843 | George Smith | Barco Corporation | 144L | 50 | \$8.99 | \$449.50 |
| 0177 | Glenda Johnson | Minimart Inc. | 777 | 5 | \$10.50 | \$52.50 |
| Sales Region | | | | | | \$36,825.00 |

Shipments: 5

Sales Region=South

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|---------------|------------------|---------|----------|------------|-------------|
| 1843 | George Smith | Cost Cutter's | 855W | 1 | \$9,109.00 | \$9,109.00 |
| 0017 | Jason Nguyen | Spirited Spirits | 407XX | 100 | \$19.95 | \$1,995.00 |
| 1843 | George Smith | Cost Cutter's | 122 | 100 | \$5.99 | \$599.00 |
| 1843 | George Smith | Ely Corp. | 122L | 10 | \$29.95 | \$299.50 |
| Sales Region | | | | | | \$12,002.50 |

Shipments: 4

ODS Listing

Output Delivery System (ODS)

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Sales Region=East

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|---------------------|----------------|-------------------|---------|----------|-------------|-------|
| 0177 | Glenda Johnson | Barco Corporation | 733 | 2 | \$10,000.00 | |
| 0017 | Jason Nguyen | Roger's Spirits | 122L | 500 | \$39.99 | |
| 0177 | Glenda Johnson | Shop and Drop | 144L | 100 | \$8.99 | |
| 0177 | Glenda Johnson | Food Unlimited | 188X | 100 | \$6.99 | |
| Sales Region | | | | | | |
| Shipments: 4 | | | | | | |

Sales Region=North

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|---------------------|----------------|-------------------|---------|----------|------------|-------------|
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | Barco Corporation | 908X | 1 | \$5,129.00 | \$5,129.00 |
| 1843 | George Smith | Barco Corporation | 144L | 50 | \$8.99 | \$449.50 |
| 0177 | Glenda Johnson | Minimart Inc. | 777 | 5 | \$10.50 | \$52.50 |
| Sales Region | | | | | | \$36,825.00 |
| Shipments: 5 | | | | | | |

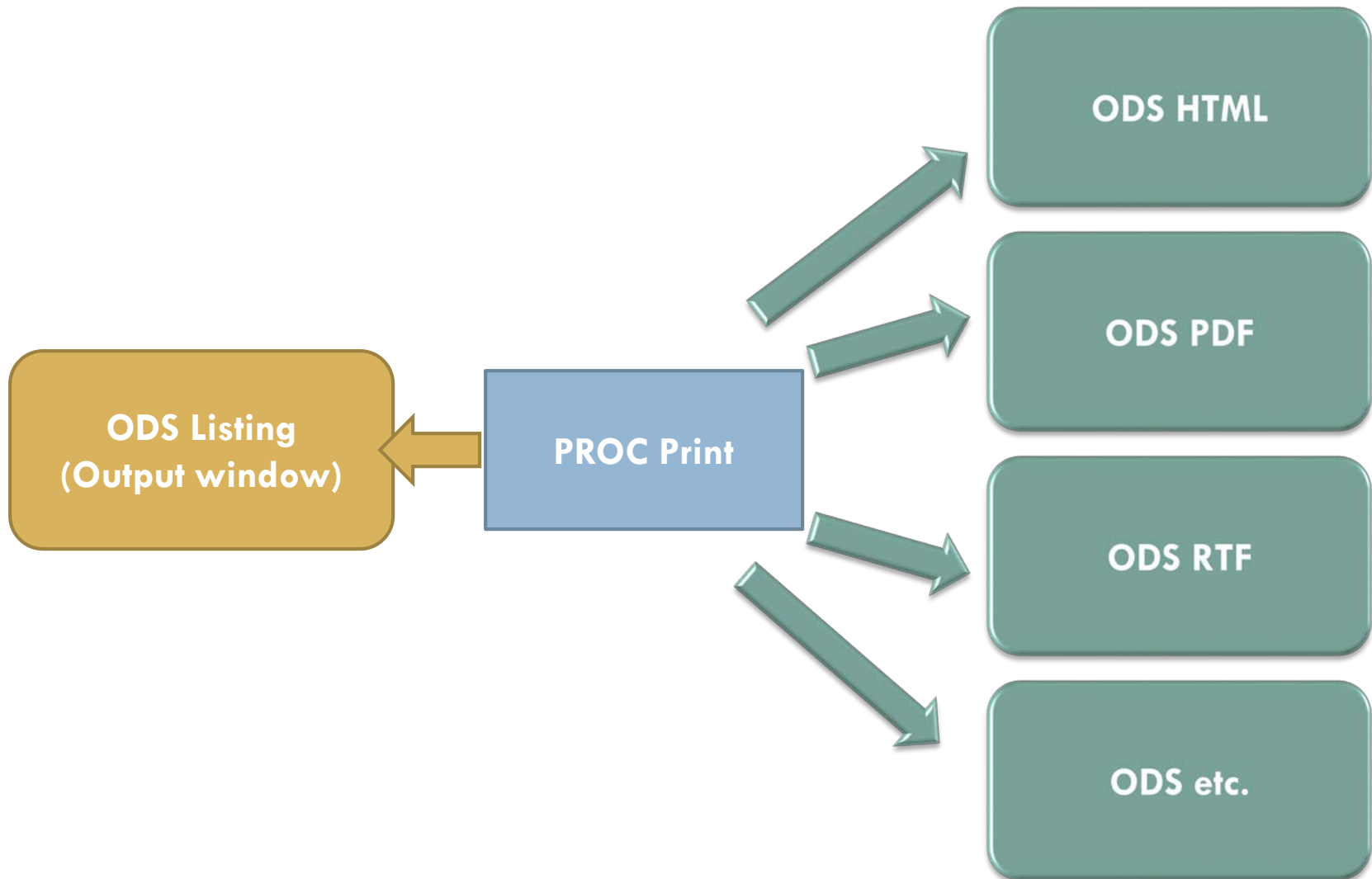
Sales Region=South

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|-------------|---------------|----------|---------|----------|-----------|-------|
|-------------|---------------|----------|---------|----------|-----------|-------|

1 of 2

ODS PDF

Output Delivery System (ODS)



Output Delivery System (ODS)

```
ODS destination FILE=`file-pathname.ext` ;  
    <...procedures...>  
ODS destination CLOSE;
```

- ***destination*** : Desired ODS destination (PDF, HTML, etc.)
- ***file-pathname.ext*** : Pathway and filename for new output file with appropriate file extension
- (Almost) every opened destination must be closed



ODS PDF

ODS open statement

Includes file pathway and filename with a .pdf extension

```
title3 "Fiscal year 2006";  
title4 "Prepared by Roger Rabbit";  
footnote "All sales figures are confidential";
```

```
ods pdf file='D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\First ODS.pdf';
```

```
proc sort data=sales; by Region descending TotalSales; run;
```

```
proc print data=sales label sumlabel n='Shipments: ' 'Total shipments: '  
id empid;  
by region;  
sumby region;  
sum totalsales;  
format totalsales unitcost dollar12.2 quantity comma6.;  
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'  
item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';  
run;
```

```
ods pdf close;
```

ODS PDF

Procedures in the ODS sandwich

PROC Print output will be included in the PDF file

PROC Sort produces no output

(Can include one or many DATA or PROC steps within the ODS sandwich)

```
footnote "All sales figures are confidential";
```

```
ods pdf file='D:\Data\OHPR_SHARED\SAS Training\SAS 9.4 - Learning SAS by Example\Output\First ODS.pdf';
```

```
proc sort data=sales; by Region descending TotalSales; run;
```

```
proc print data=sales label sumlabel n='Shipments: ' 'Total shipments: ';
```

```
id empid;
```

```
by region;
```

```
sumby region;
```

```
sum totalsales;
```

```
format totalsales unitcost dollar12.2 quantity comma6.;
```

```
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'
```

```
item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';
```

```
run;
```

```
ods pdf close;
```

ODS PDF

```
options nodate orientation=landscape;

title1 "The XYZ Company";
title3 "Fiscal year 2006";
title4 "Prepared by Roger Rabbit";
footnote "All sales figures are confidential";

ods pdf file='D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\First ODS.pdf';
```

```
proc sort data=sales; by Region descending TotalSales; run;
```

ODS close statement

File will not be created until ODS close statement

```
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'
      item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';

run;
```

```
ods pdf close;
```

ODS PDF

```
options nodate orientation=landscape;
```

```
title1 "The XYZ Company";  
title3 "Fiscal year 2006";  
title4 "Prepared by Roger Rabbit";
```

System options

Some system options will not affect ODS output (depending on the destination)

```
id empid;  
by region;  
sumby region;  
sum totalsales;  
format totalsales unitcost dollar12.2 quantity comma6.;  
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'  
      item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';  
run;  
  
ods pdf close;
```

ODS PDF

```
options nodate orientation=landscape;
```

```
title1 "The XYZ Company";  
title3 "Fiscal year 2006";  
title4 "Prepared by Roger Rabbit";  
footnote "All sales figures are confidential";
```

```
ods pdf file='D:\Data\OHPR_SHARED\SAS Training\SAS 9.1 - Learning SAS by Example\Output\First ODS.pdf';
```

```
proc sort data=sales; by Region descending Total; run;
```

Titles/Footnotes

Can also be changed within the ODS sandwich

```
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'  
item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';
```

```
run;
```

```
ods pdf close;
```

ODS PDF

The XYZ Company
Fiscal year 2006
Prepared by Roger Rabbit

1

Sales Region=East

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|-------------------|---------|----------|-------------|--------------------|
| 0177 | Glenda Johnson | Barco Corporation | 733 | 2 | \$10,000.00 | \$20,000.00 |
| 0017 | Jason Nguyen | Roger's Spirits | 122L | 500 | \$39.99 | \$19,995.00 |
| 0177 | Glenda Johnson | Shop and Drop | 144L | 100 | \$8.99 | \$899.00 |
| 0177 | Glenda Johnson | Food Unlimited | 188X | 100 | \$6.99 | \$699.00 |
| Sales Region | | | | | | \$41,593.00 |
| Shipments: 4 | | | | | | |

Sales Region=North

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|-------------------|---------|----------|------------|--------------------|
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | Barco Corporation | 908X | 1 | \$5,129.00 | \$5,129.00 |
| 1843 | George Smith | Barco Corporation | 144L | 50 | \$8.99 | \$449.50 |
| 0177 | Glenda Johnson | Minimart Inc. | 777 | 5 | \$10.50 | \$52.50 |
| Sales Region | | | | | | \$36,825.00 |
| Shipments: 5 | | | | | | |

All sales figures are confidential

ODS Styles

Add a style option to give the report some “pizzazz”

```
ods pdf file="D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\First ODS.pdf" style=sasweb;
```

```
proc sort data=sales; by Region descending TotalSales; run;
```

```
proc print data=sales label sumlabel n='Shipments: ' 'Total shipments: ';
```

```
id empid;
```

```
by region;
```

```
sumby region;
```

```
sum totalsales;
```

```
format totalsales unitcost dollar12.2 quantity comma6.;
```

```
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'
```

```
item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';
```

```
run;
```

```
ods pdf close;
```

ODS Styles

The XYZ Company
Fiscal year 2006
Prepared by Roger Rabbit

Sales Region=East

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|---------------------|----------------|-------------------|---------|----------|-------------|--------------------|
| 0177 | Glenda Johnson | Barco Corporation | 733 | 2 | \$10,000.00 | \$20,000.00 |
| 0017 | Jason Nguyen | Roger's Spirits | 122L | 500 | \$39.99 | \$19,995.00 |
| 0177 | Glenda Johnson | Shop and Drop | 144L | 100 | \$8.99 | \$899.00 |
| 0177 | Glenda Johnson | Food Unlimited | 188X | 100 | \$6.99 | \$699.00 |
| Sales Region | | | | | | \$41,593.00 |
| Shipments: 4 | | | | | | |

Sales Region=North

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|---------------------|----------------|-------------------|---------|----------|------------|--------------------|
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | Barco Corporation | 908X | 1 | \$5,129.00 | \$5,129.00 |
| 1843 | George Smith | Barco Corporation | 144L | 50 | \$8.99 | \$449.50 |
| 0177 | Glenda Johnson | Minimart Inc. | 777 | 5 | \$10.50 | \$52.50 |
| Sales Region | | | | | | \$36,825.00 |
| Shipments: 5 | | | | | | |

Sales Region=South

| Employee ID | Employee Name | Customer | Item ID | Quantity | Unit Cost | Sales |
|-------------|---------------|------------------|---------|----------|------------|------------|
| 1843 | George Smith | Cost Cutter's | 855W | 1 | \$9,109.00 | \$9,109.00 |
| 0017 | Jason Nguyen | Spirited Spirits | 407XX | 100 | \$19.95 | \$1,995.00 |
| 1843 | George Smith | Cost Cutter's | 122 | 100 | \$5.99 | \$599.00 |
| 1843 | George Smith | Ely Corp. | 122L | 10 | \$29.95 | \$299.50 |

All sales figures are confidential

ODS Styles

- Style templates can be used with (almost) any destination
- Templates control the format and appearance of the report – font, colors, sizing, justification, etc.
- Can use SAS supplied templates or create your own with PROC Template
- To see the list of available style templates:

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



ODS Styles

```
options nodate orientation=landscape;

title1 "The XYZ Company";
title3 "Fiscal year 2006";
title4 "Prepared by Roger Rabbit";
footnote "All sales figures are confidential";

ods pdf file='D:\Data\OHPR_SHARED\SAS Training\SAS
style=sasweb;
```

Can use style overrides within the SAS procedure to modify one small aspect of the style.

```
proc sort data=sales; by Region descending TotalSales; run;

proc print data=sales label sumlabel n='Shipments: ' 'Total shipments: ';
id empid;
by region;
var name region customer item quantity unitcost totalsales / style(column)={background=#33EE44};
sumby region;
sum totalsales;
format totalsales unitcost dollar12.2 quantity comma6.;
label empid = 'Employee ID' name = 'Employee Name' region='Sales Region' customer = 'Customer'
item = 'Item ID' quantity = 'Quantity' unitcost = 'Unit Cost' totalsales = 'Sales';
run;

ods pdf close;
```

ODS Styles

The XYZ Company
Fiscal year 2006
Prepared by Roger Rabbit

Sales Region=East

| Employee ID | Employee Name | Sales Region | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|--------------|-------------------|---------|----------|-------------|-------------|
| 0177 | Glenda Johnson | East | Barco Corporation | 733 | 2 | \$10,000.00 | \$20,000.00 |
| 0017 | Jason Nguyen | East | Roger's Spirits | 122L | 500 | \$39.99 | \$19,995.00 |
| 0177 | Glenda Johnson | East | Shop and Drop | 144L | 100 | \$8.99 | \$899.00 |
| 0177 | Glenda Johnson | East | Food Unlimited | 188X | 100 | \$6.99 | \$699.00 |
| Sales Region | | | | | | | \$41,593.00 |
| Shipments: 4 | | | | | | | |

Sales Region=North

| Employee ID | Employee Name | Sales Region | Customer | Item ID | Quantity | Unit Cost | Sales |
|--------------|----------------|--------------|-------------------|---------|----------|------------|-------------|
| 1843 | George Smith | North | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | North | Minimart Inc. | 188S | 3 | \$5,199.00 | \$15,597.00 |
| 1843 | George Smith | North | Barco Corporation | 908X | 1 | \$5,129.00 | \$5,129.00 |
| 1843 | George Smith | North | Barco Corporation | 144L | 50 | \$8.99 | \$449.50 |
| 0177 | Glenda Johnson | North | Minimart Inc. | 777 | 5 | \$10.50 | \$52.50 |
| Sales Region | | | | | | | \$36,825.00 |
| Shipments: 5 | | | | | | | |

Sales Region=South

| Employee ID | Employee Name | Sales Region | Customer | Item ID | Quantity | Unit Cost | Sales |
|-------------|---------------|--------------|------------------|---------|----------|------------|------------|
| 1843 | George Smith | South | Cost Cutter's | 855W | 1 | \$9,109.00 | \$9,109.00 |
| 0017 | Jason Nguyen | South | Sprinted Spirits | 407XX | 100 | \$19.95 | \$1,995.00 |
| 1843 | George Smith | South | Cost Cutter's | 122 | 100 | \$5.99 | \$599.00 |
| 1843 | George Smith | South | Ely Corp. | 122L | 10 | \$29.95 | \$299.50 |



ODS Escapechar

- ODS Escapechar defines a character that can begin formatting commands
 - ▣ Allows formatting commands to be put in non-standard locations, such as titles, footnotes, row headers, etc.



ODS Escapechar

Footnotes from an ODS PDF produced report

| County | 1,700 | 1,740 | 1,800 | 1,807 |
|-----------|-------|-------|-------|-------|
| Polk | 72 | 86 | 85 | 77 |
| Sherman | 1 | 1 | 1 | 3 |
| Tillamook | 45 | 40 | 41 | 30 |
| Umatilla | 138 | 150 | 150 | 134 |

(Continued)

Longer than traditional
footnotes would allow

Accepted disabling claims are occupational injuries or illness claims, accepted by insurers, that entitle workers to compensation for disability or death.

For statistical analysis purposes, the Department of Consumer & Business Services Department uses the definition of a musculoskeletal disorder as defined by Federal OSHA. The definition comes out of the former proposal of Ergonomic Standards and is defined as sprains, strains, and tears; pain; carpal tunnel syndrome; hernia, or musculoskeletal diseases -- when caused by bending, reaching, or twisting; overexertion; or repetitive motion.

Claim characteristics are classified according to the Occupational Injury and Illness Classification System (OIICS).

Note: Dashes indicate no claims were received.

Data are based on the date the Department of Consumer and Business Services received notification that the disabling claim was accepted, which may be different than the date of injury or illness.

Source data are continually updated to be as accurate as possible, so report results may vary over time.

Source: Information Management Division, Oregon Department of Consumer and Business Services, September 2010

ODS Escapechar

Footnotes from an ODS PDF produced report

| County | 2008 | 2009 | 2010 | 2011 | 2012 | Total | Rate |
|-----------|------|------|------|------|------|-------|------|
| Polk | 72 | 86 | 85 | 77 | 73 | 393 | 1.2 |
| Sherman | 1 | 1 | 1 | 3 | 1 | 7 | 0.0 |
| Tillamook | 45 | 40 | 41 | 30 | 27 | 183 | 0.5 |
| Umatilla | 138 | 150 | 150 | 134 | 139 | 711 | 2.1 |

(Continued)

Accepted disabling claims are those accepted by insurers, that entitle workers to compensation for disability or death.

For statistical analysis, a musculoskeletal disorder as defined by Federal Occupational Safety and Health (OSHA) includes sprains, strains, and tears; pinching; bruising; lacerations; fractures; dislocations; twisting; overexertion; or repetitive motion.

Claim characteristics are classified according to the Occupational Injury and Illness Classification System (OIICS).

Note: Dashes indicate no claims were received.

Data are based on the date the Department of Consumer and Business Services received notification that the disabling claim was accepted, which may be different than the date of injury or illness.

Source data are continually updated to be as accurate as possible, so report results may vary over time.

Source: Information Management Division, Oregon Department of Consumer and Business Services, September 2010

Custom line breaks

ODS Escapechar

Footnotes from an ODS PDF produced report

| County | 2008 | 2009 | 2010 | 2011 | 2012 | Total | Rate |
|-----------|------|------|------|------|------|-------|------|
| Polk | 72 | 86 | 85 | 77 | 73 | 393 | 1.2 |
| Sherman | 1 | 1 | 1 | 3 | 1 | 7 | 0.0 |
| Tillamook | 45 | 40 | 41 | 30 | 27 | 183 | 0.5 |
| Umatilla | 138 | 150 | 150 | 134 | 139 | 711 | 2.1 |

(Continued)

Accepted disabling claims are occupational injuries or illness claims, accepted by insurers, that entitle workers to compensation for disability or death.

For statistical analysis purposes, the Department of Consumer & Business Services Department uses the definition of a musculoskeletal disorder as defined by Federal OSHA. The definition comes out of the former proposal of Ergonomic Standards and is defined as sprains, strains, and tears; pain; carpal tunnel syndrome; hernia, or musculoskeletal diseases -- when caused by bending, reaching, or twisting; overexertion; or repetitive motion.

Claim characteristics are classified according to the Occupational Injury and Illness Classification System (OIICS).

Note: Dashes indicate

Data are based on claims accepted by insurers, which may differ from the number of claims reported to the Department of Consumer & Business Services received notification that the disabling claim was accepted, which may differ from the number of claims reported to the Department of Consumer & Business Services.

Source data are continually updated to be as accurate as possible, so report results may vary over time.

Source: Information Management Division, Oregon Department of Consumer and Business Services, September 2010

Changes in font style

ODS Escapechar

Define the escapechar (can be anything you choose)
Common choices are ~ or ^

```
options nodate nonumber;  
ods escapechar='~';  
ods _pdf_files_ (ods claims by county);
```

```
TITLE 'Accepted disabling claims due to musculoskeletal disorders by county, Oregon, 2003-2009';
```

```
footnote
```

```
'~S={font_weight=medium font_style=roman just=left}Accepted disabling  
claims are occupational injuries or illness claims, accepted by  
insurers, that entitle workers to compensation for disability or  
death.~2n
```

```
For statistical analysis purposes, the Department of Consumer & Business Services Department  
uses the definition of a musculoskeletal disorder as defined by Federal OSHA.
```

```
The definition comes out of the former proposal of Ergonomic Standards and is defined as sprains,  
strains, and tears; pain; carpal tunnel syndrome; hernia, or musculoskeletal diseases -- when caused  
by bending, reaching, or twisting; overexertion; or repetitive motion.~2n
```

```
Claim characteristics are classified according to the Occupational Injury  
and Illness Classification System (OIICS).~n
```

```
Note: Dashes indicate no claims were received.~2n
```

```
Data are based on the date the Department of Consumer and Business  
Services received notification that the disabling claim was accepted,  
which may be different than the date of injury or illness.~2n
```

```
Source data are continually updated to be as accurate as possible,  
so report results may vary over time.~2n
```

```
~S={font_style=italic just=left}Source: Information Management Division,  
Oregon Department of Consumer and Business Services, September 2010';
```

```
□ PROC TABULATE FORMAT=comma6. ;  
FORMAT county cntyFMT. ;
```

ODS Escapechar

```
options nodate nonumber;
ods escapechar='~';
ods pdf file='MSD claims by county.pdf' style=sasweb;

TITLE 'Accepted disabling claims due to musculoskeletal disorders by county, Oregon, 2005-2009';
```

```
footnote
```

```
~S={font_weight=medium font_style=roman just=left}Accepted disabling
claims due to occupational injuries or illness, accepted by
insurers, that entitle workers to compensation for disability or
death.~2n
```

```
For statistical analysis, the Department of Consumer & Business Services Department
uses the definition of a musculoskeletal disorder as defined by Federal OSHA.
```

```
standards and is defined as sprains,
musculoskeletal diseases -- when caused
tion.~2n
l Injury
```

Use escape sequences to embed style parameters:
~S={*style overrides*} or ~STYLE={*style overrides*}

```
Data are based on the date the Department of Consumer and Business
Services received notification that the disabling claim was accepted,
which may be different than the date of injury or illness.~2n
Source data are continually updated to be as accurate as possible,
so report results may vary over time.~2n
~S={font_style=italic just=left}Source: Information Management Division,
Oregon Department of Consumer and Business Services, September 2010';
```

```
PROC TABULATE FORMAT=comma6.;
FORMAT county cntyFMT.;
```

ODS Escapechar

```
options nodate nonumber;
ods escapechar='~';
ods pdf file='MSD claims by county.pdf' style=sasweb;

TITLE 'Accepted disabling claims due to musculoskeletal disorders by county, Oregon, 2005-2009';

footnote
  ~S={font_weight=medium font_style=normal just=left}Accepted disabling
  claims
  insurer
  death.~
For stat
  uses th
  The definition comes out of the former pr
  l of Ergonomic Standards and is defined as sprains,
  strains, and tears; pain; carpal tunnel
  hernia, or musculoskeletal diseases -- when caused
  by bending, reaching, or twisting; overexer
  ; or repetitive motion.~2n
Claim characteristics are classified according
  to the Occupational Injury
  and Illness Classification System (OIIIS).~n
Note: Dashes indicate no claims were received.~2n
Data are based on the date the Department of Consumer and Business
  Services received notification that the disabling claim was accepted,
  which may be different than the date of injury or illness.~2n
Source data are continually updated to be as accurate as possible,
  so report results may vary over time.~2n
~S={font_style=italic just=left}Source: Information Management Division,
  Oregon Department of Consumer and Business Services, September 2010';
```

Use ~n and ~2n to create line and double line breaks

```
❏ PROC TABULATE FORMAT=comma6.;
  FORMAT county cntyFMT.;
```

ODS Escapechar

```
options nodate nonumber;
ods escapechar='~';
ods pdf file='MSD claims by county.pdf' style=sasweb;

TITLE 'Accepted disabling claims due to musculoskeletal disorders by county, Oregon, 2005-2009';

footnote
  '~S={font_weight=medium font_style=roman just=left}Accepted disabling
  claims are occupational injuries or illness claims, accepted by
  insurers, that entitle workers to compensation for disability or
  death.~2n
  For statistical analysis purposes, the Department of Consumer & Business Services Department
  uses the definition of a musculoskeletal disorder as defined by Federal OSHA.
  The definition comes out of the former proposal of Ergonomic Standards and is defined as sprains,
  strains, and tears; pain; carpal tunnel syndrome; hernia, or musculoskeletal diseases -- when caused
  by bending, reaching, or twisting; overexertion; or repetitive motion.~2n
  Claim characteristics are classified according to the Occupational and Illness Classification System (OIICS).~n
  Note: Dashes indicate no claims were received.~2n
  Data are based on the date the Department of Consumer and Business Services received notification that the disabling claim was a
  which may be different than the date of injury or illness.~2n
  Source data are continually updated to be as accurate as possible so report results may vary over time.~2n
  ~S={font_style=italic just=left}Source: Information Management
  Oregon Department of Consumer and Business Services, September
```

Quick note: SAS Log may warn that the footnote may be too long, but it should print properly in PDF

```
PROC TABULATE FORMAT=comma6.;
FORMAT county cntyFMT.;
```

Excel

- Multiple ways to save SAS output to Excel
- Use ODS HTML with a .xls extension

```
ods html style=minimal
  file='D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\ODS HTML Excel.xls';

□ proc print data=sales label; run;

ods html close;
```

- Use ExcelXP Tagset

```
ods tagsets.ExcelXP style=minimal
  file='D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\ODS ExcelXP.xml';

□ proc print data=sales label; run;

ods tagsets.ExcelXP close;
```

ExcelXP Tagset

```
ods tagsets.ExcelXP style=minimal  
    file='D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\ODS ExcelXP.xml';  
proc print data=sales label; run;  
ods tagsets.ExcelXP close;
```

- Excel XP Tagset creates XML files that can be read by Excel (version XP and later)
- Can create multi-sheet workbooks



ODS Trace

- Some procedures (particularly stat procedures) produce multiple pieces of output
- ODS Trace will print the names of the output objects in the log

```
ods trace on;  
proc univariate data=sales;  
run;  
ods trace off;
```

```
620  
621 ods trace on;  
622 proc univariate data=sales;  
623 run;  
  
Output Added:  
-----  
Name:      Moments  
Label:     Moments  
Template:  base.univariate.Moments  
Path:     Univariate.Quantity.Moments  
-----  
  
Output Added:  
-----  
Name:      BasicMeasures  
Label:     Basic Measures of Location and Variability  
Template:  base.univariate.Measures  
Path:     Univariate.Quantity.BasicMeasures  
-----  
  
Output Added:  
-----  
Name:      TestsForLocation  
Label:     Tests For Location
```

ODS Select/Exclude

- Use ODS Select or ODS Exclude to only include certain objects in your output file
 - ▣ Use the “Name” from the ODS Trace output to name the objects to select or exclude

```
ods select extremeobs;
```

```
ods pdf file='D:\Data\OHPR_SHARED\SAS Training\SAS 101 - Learning SAS by Example\Output\ExtremeObs.pdf';
```

```
proc univariate data=sales;  
run;
```

```
ods pdf close;
```

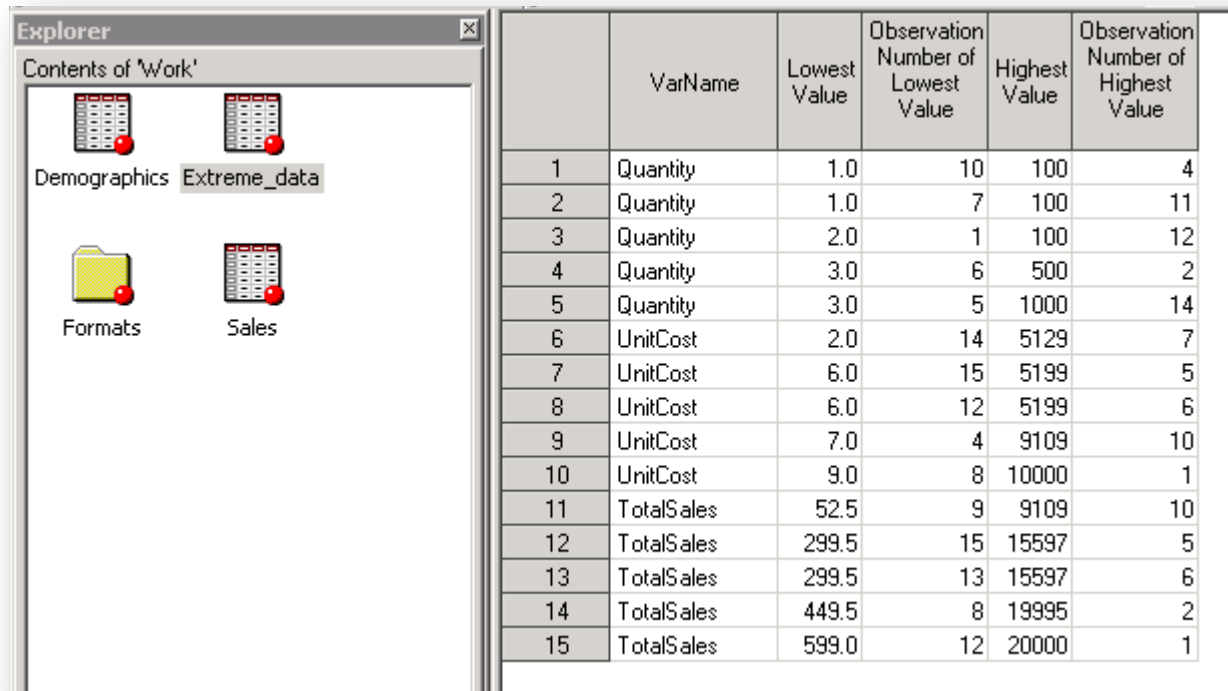
ODS Output

- Many procedures have OUT= or OUTPUT statement options to send results to a SAS dataset
- Can also use ODS OUTPUT to send your output results to a SAS dataset

```
ODS OUTPUT <object>=<libref.dataset-name>;
```

ODS Output

```
ods output extremeobs = Extreme_Data;  
proc univariate data=sales;  
run;
```



The screenshot shows the SAS Explorer window with the 'Contents of 'Work'' directory. It contains folders for 'Demographics', 'Extreme_data', 'Formats', and 'Sales'. To the right, a table displays the ODS output for the 'Extreme_Data' dataset, listing 15 observations with their respective variable names, lowest values, highest values, and observation numbers.

| | VarName | Lowest Value | Observation Number of Lowest Value | Highest Value | Observation Number of Highest Value |
|----|------------|--------------|------------------------------------|---------------|-------------------------------------|
| 1 | Quantity | 1.0 | 10 | 100 | 4 |
| 2 | Quantity | 1.0 | 7 | 100 | 11 |
| 3 | Quantity | 2.0 | 1 | 100 | 12 |
| 4 | Quantity | 3.0 | 6 | 500 | 2 |
| 5 | Quantity | 3.0 | 5 | 1000 | 14 |
| 6 | UnitCost | 2.0 | 14 | 5129 | 7 |
| 7 | UnitCost | 6.0 | 15 | 5199 | 5 |
| 8 | UnitCost | 6.0 | 12 | 5199 | 6 |
| 9 | UnitCost | 7.0 | 4 | 9109 | 10 |
| 10 | UnitCost | 9.0 | 8 | 10000 | 1 |
| 11 | TotalSales | 52.5 | 9 | 9109 | 10 |
| 12 | TotalSales | 299.5 | 15 | 15597 | 5 |
| 13 | TotalSales | 299.5 | 13 | 15597 | 6 |
| 14 | TotalSales | 449.5 | 8 | 19995 | 2 |
| 15 | TotalSales | 599.0 | 12 | 20000 | 1 |

ODS Reading List

| Paper | Summary |
|--|---|
| <u>ODS: Output Delivery System Tip Sheet</u> | Quick tip sheet for common options to use with ODS |
| <u>SAS Styles Examples</u> | Examples of SAS style templates |
| <u>Reporting Procedure Styles Tip Sheet</u> | Quick tip sheet for using style overrides in PROC steps |
| <u>PDF Can Be Pretty Darn Fancy</u> | Advanced tips and tricks for ODS PDF including using ODS EscapeChar and ODS Layout |
| <u>An Introduction to Creating Multi-Sheet Microsoft Excel Workbooks the Easy Way with SAS® (2012)</u> | Tips for using the ExcelXP tagset. This is only one of many similar papers written by Vince DelGobbo. |
| <u>ExcelXP Tagset Paper Index</u> | An index for all the tricks found in Vince's many ExcelXP Tagset papers |
| <u>The Greatest Hits: ODS Essentials Every User Should Know</u> | More ODS tips and tricks including using ODS output, ODS Graphics, cascading style sheets, and more. |

For next week...

Read chapters 16 & 17
and section 10.6