

# An Introduction to Creating Multi-Sheet Microsoft Excel Workbooks the Easy Way with SAS®

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## Goals

- Integrate SAS output w/ Excel
- Give you something you can use TODAY



## Software Requirements

- Base SAS, *any* operating system
- SAS 9.1.3 or later
- Modified version of the ExcelXP tagset  
(see "More Tips and Tricks..." paper for details)
- Microsoft Excel XP or later (a.k.a. Excel 2002)

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## General Steps

1. Run SAS code to create output
2. Store output where Excel can access it
3. Open output with Excel
4. Modify SAS code to correct formatting problems

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## ODS Basics

- Part of Base SAS
- Easily generate multiple output types (HTML, RTF, PDF, XML, etc.)
- A "destination" creates the actual output
- A "style" controls the appearance
- Usage:

HTML or RTF or PDF ...

```
ods DestName style=StyleName file=... ;  
  * Your SAS procedure code here;  
ods DestName close;
```

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## ODS Basics – Output for Excel

- Excel can open specially made XML files as multi-sheet workbooks (graphics not supported)
- Use the ExcelXP tagset and sansPrinter style:

```
ods listing close;  
ods tagsets.ExcelXP style=sansPrinter  
  file=... ;  
  * Your SAS procedure code here;  
ods tagsets.ExcelXP close;
```

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## Sample SAS Code

```
title 'The CLASS Dataset';
footnote '(From the SASHELP library)';

proc print data=sashelp.class noobs;
  where (sex eq 'M');
  var name age height weight;
run; quit;

proc print data=sashelp.class noobs;
  where (sex eq 'F');
  var name age height weight;
run; quit;
```

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## SAS Listing Output

| Name   | Age | Height | Weight |
|--------|-----|--------|--------|
| Alfred | 14  | 69.0   | 112.5  |
| Henry  | 14  | 63.5   | 102.5  |
| James  | 12  | 57.3   | 83.0   |
| ...    |     |        |        |

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alice   | 13  | 56.5   | 84.0   |
| Barbara | 13  | 65.3   | 98.0   |
| Carol   | 14  | 62.8   | 102.5  |
| ...     |     |        |        |

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## Using ODS and the ExcelXP Tagset

```
title 'The CLASS Dataset';
footnote '(From the SASHELP library)';

proc print data=sashelp.class noobs;
  where (sex eq 'M');
  var name age height weight;
run; quit;

proc print data=sashelp.class noobs;
  where (sex eq 'F');
  var name age height weight;
run; quit;
```

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## Using ODS and the ExcelXP Tagset

```
ods tagsets.ExcelXP file='MyWorkbook.xml'
  style=sansPrinter;
```

```
title 'The CLASS Dataset';
footnote '(From the SASHELP library)';

proc print data=sashelp.class noobs;
  where (sex eq 'M');
  var name age height weight;
run; quit;

proc print data=sashelp.class noobs;
  where (sex eq 'F');
  var name age height weight;
run; quit;
```

```
ods tagsets.ExcelXP close;
```

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## Open MyWorkbook.xml with Excel

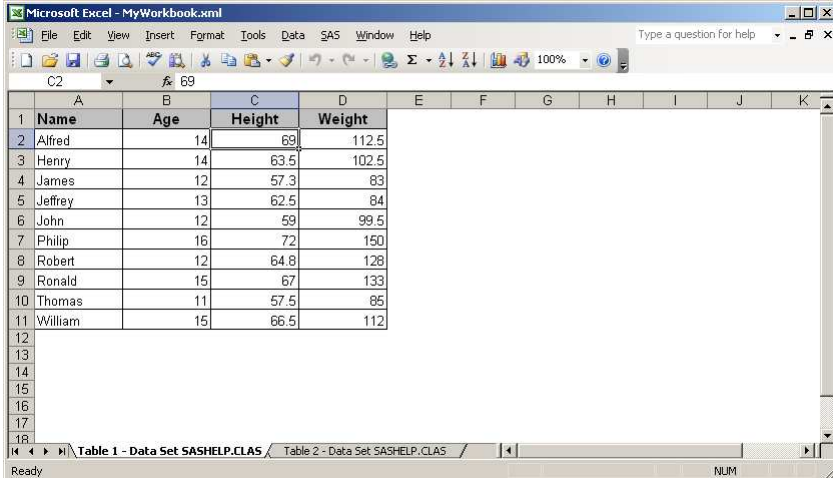
- Open Excel: Start > Programs > . . .
- File > Open
- Navigate to ...MyWorkbook.xml and click **Open**

~ OR ~

- Navigate to output directory and double-click **MyWorkbook.xml**

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## MyWorkbook.xml Viewed with Excel



The screenshot shows a Microsoft Excel window titled "MyWorkbook.xml". The spreadsheet contains a table with the following data:

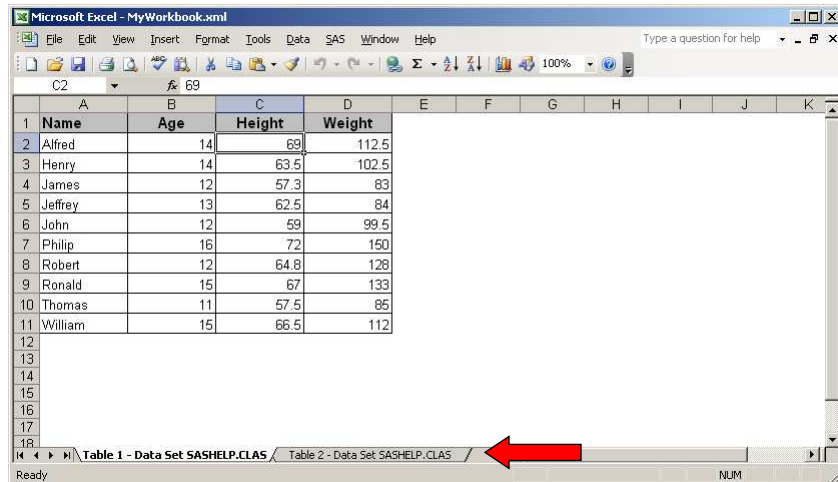
|    | A       | B   | C      | D      | E | F | G | H | I | J | K |
|----|---------|-----|--------|--------|---|---|---|---|---|---|---|
| 1  | Name    | Age | Height | Weight |   |   |   |   |   |   |   |
| 2  | Alfred  | 14  | 69     | 112.5  |   |   |   |   |   |   |   |
| 3  | Henry   | 14  | 63.5   | 102.5  |   |   |   |   |   |   |   |
| 4  | James   | 12  | 57.3   | 83     |   |   |   |   |   |   |   |
| 5  | Jeffrey | 13  | 62.5   | 84     |   |   |   |   |   |   |   |
| 6  | John    | 12  | 59     | 99.5   |   |   |   |   |   |   |   |
| 7  | Philip  | 16  | 72     | 150    |   |   |   |   |   |   |   |
| 8  | Robert  | 12  | 64.8   | 128    |   |   |   |   |   |   |   |
| 9  | Ronald  | 15  | 67     | 133    |   |   |   |   |   |   |   |
| 10 | Thomas  | 11  | 57.5   | 85     |   |   |   |   |   |   |   |
| 11 | William | 15  | 66.5   | 112    |   |   |   |   |   |   |   |
| 12 |         |     |        |        |   |   |   |   |   |   |   |
| 13 |         |     |        |        |   |   |   |   |   |   |   |
| 14 |         |     |        |        |   |   |   |   |   |   |   |
| 15 |         |     |        |        |   |   |   |   |   |   |   |
| 16 |         |     |        |        |   |   |   |   |   |   |   |
| 17 |         |     |        |        |   |   |   |   |   |   |   |
| 18 |         |     |        |        |   |   |   |   |   |   |   |

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# Understanding and Using the ExcelXP Tagset Options

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## Supply Your Own Worksheet Names



|    | A       | B   | C      | D      | E | F | G | H | I | J | K |
|----|---------|-----|--------|--------|---|---|---|---|---|---|---|
| 1  | Name    | Age | Height | Weight |   |   |   |   |   |   |   |
| 2  | Alfred  | 14  | 69     | 112.5  |   |   |   |   |   |   |   |
| 3  | Henry   | 14  | 63.5   | 102.5  |   |   |   |   |   |   |   |
| 4  | James   | 12  | 57.3   | 83     |   |   |   |   |   |   |   |
| 5  | Jeffrey | 13  | 62.5   | 84     |   |   |   |   |   |   |   |
| 6  | John    | 12  | 59     | 99.5   |   |   |   |   |   |   |   |
| 7  | Philip  | 16  | 72     | 150    |   |   |   |   |   |   |   |
| 8  | Robert  | 12  | 64.8   | 128    |   |   |   |   |   |   |   |
| 9  | Ronald  | 15  | 67     | 133    |   |   |   |   |   |   |   |
| 10 | Thomas  | 11  | 57.5   | 85     |   |   |   |   |   |   |   |
| 11 | William | 15  | 66.5   | 112    |   |   |   |   |   |   |   |
| 12 |         |     |        |        |   |   |   |   |   |   |   |
| 13 |         |     |        |        |   |   |   |   |   |   |   |
| 14 |         |     |        |        |   |   |   |   |   |   |   |
| 15 |         |     |        |        |   |   |   |   |   |   |   |
| 16 |         |     |        |        |   |   |   |   |   |   |   |
| 17 |         |     |        |        |   |   |   |   |   |   |   |
| 18 |         |     |        |        |   |   |   |   |   |   |   |

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## ExcelXP Supports Tagset Options

- Syntax: `options(option-name='option-value')`

- Can control the worksheet name:

```
options(sheet_name='worksheet-name');
```

- Can have multiple ODS statements
- Options remain in effect until changed !

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## Supply Your Own Worksheet Names

```
ods tagsets.ExcelXP style=sansPrinter file= ... ;  
title ...; footnote ...;
```

```
ods tagsets.ExcelXP options(sheet_name='Male  
Students');
```

```
proc print ...;  
  where (sex eq 'M');  
  ... ;  
run; quit;
```

```
ods tagsets.ExcelXP options(sheet_name='Female  
Students');
```

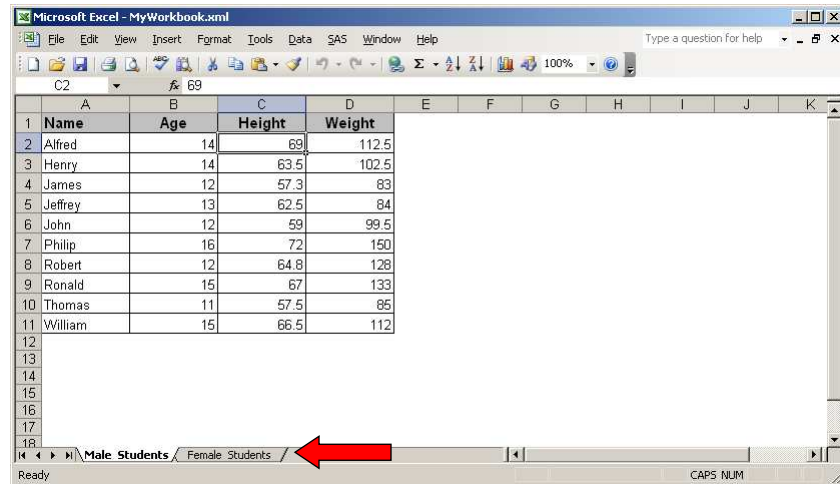
```
proc print ...;  
  where (sex eq 'F');  
  ... ;  
run; quit;
```

```
ods tagsets.ExcelXP close;
```

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## Supply Your Own Worksheet Names



The screenshot shows a Microsoft Excel window titled 'Microsoft Excel - MyWorkbook.xml'. The worksheet contains the following data:

|    | A       | B   | C      | D      | E | F | G | H | I | J | K |
|----|---------|-----|--------|--------|---|---|---|---|---|---|---|
| 1  | Name    | Age | Height | Weight |   |   |   |   |   |   |   |
| 2  | Alfred  | 14  | 69     | 112.5  |   |   |   |   |   |   |   |
| 3  | Henry   | 14  | 63.5   | 102.5  |   |   |   |   |   |   |   |
| 4  | James   | 12  | 57.3   | 83     |   |   |   |   |   |   |   |
| 5  | Jeffrey | 13  | 62.5   | 84     |   |   |   |   |   |   |   |
| 6  | John    | 12  | 59     | 99.5   |   |   |   |   |   |   |   |
| 7  | Philip  | 16  | 72     | 150    |   |   |   |   |   |   |   |
| 8  | Robert  | 12  | 64.8   | 128    |   |   |   |   |   |   |   |
| 9  | Ronald  | 15  | 67     | 133    |   |   |   |   |   |   |   |
| 10 | Thomas  | 11  | 57.5   | 85     |   |   |   |   |   |   |   |
| 11 | William | 15  | 66.5   | 112    |   |   |   |   |   |   |   |
| 12 |         |     |        |        |   |   |   |   |   |   |   |
| 13 |         |     |        |        |   |   |   |   |   |   |   |
| 14 |         |     |        |        |   |   |   |   |   |   |   |
| 15 |         |     |        |        |   |   |   |   |   |   |   |
| 16 |         |     |        |        |   |   |   |   |   |   |   |
| 17 |         |     |        |        |   |   |   |   |   |   |   |
| 18 |         |     |        |        |   |   |   |   |   |   |   |

The bottom-left corner of the Excel window shows the worksheet name 'Male\_Students' with a red arrow pointing to it. The status bar at the bottom indicates 'Ready' and 'CAPS NUM'.

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## Display Titles & Footnotes in Worksheet

- Title text → Excel print header
- Footnote text → Excel print footer
- Can control location of title & footnote text:

```
options(embedded_titles='yes'  
        embedded_footnotes='yes')
```

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## Display Titles & Footnotes in Worksheet

```
ods tagsets.ExcelXP style=sansPrinter file= ... ;  
title ...; footnote ...;  
* Set some "global" tagset options;  
ods tagsets.ExcelXP  
  options(embedded_titles='yes'  
          embedded_footnotes='yes');  
ods tagsets.ExcelXP options(sheet_name=...);  
proc print ...; run; quit;  
ods tagsets.ExcelXP options(sheet_name=...);  
proc print ...; run; quit;  
ods tagsets.ExcelXP close;
```

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## Display Titles & Footnotes in Worksheet

The screenshot shows a Microsoft Excel window with a worksheet titled 'MyWorkbook.xml'. The worksheet contains a table with the following data:

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alfred  | 14  | 69     | 112.5  |
| Henry   | 14  | 63.5   | 102.5  |
| James   | 12  | 57.3   | 83     |
| Jeffrey | 13  | 62.5   | 84     |
| John    | 12  | 59     | 99.5   |
| Philip  | 16  | 72     | 150    |
| Robert  | 12  | 64.8   | 128    |
| Ronald  | 15  | 67     | 133    |
| Thomas  | 11  | 57.5   | 85     |
| William | 15  | 66.5   | 112    |

The title 'The CLASS Dataset' is displayed in cell D1, and the text '(From the SASHELP library)' is displayed in cell D15. Red arrows point to these elements.

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## Can Also Have Print Headers & Footers

```
options(print_header='header-text'  
        print_footer='footer-text')
```

Example:

```
print_header='&C&A&RPage &P of &N'  
print_footer='&RPrinted &D at &T'
```

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## Can Also Have Print Headers & Footers

```
print_header='&C&A&RPage &P of &N'  
print_footer='&RPrinted &D at &T'
```

| Control Sequence | Function               |
|------------------|------------------------|
| &C               | Center text            |
| &A               | Insert sheet name      |
| &R               | Right-justify text     |
| &P               | Insert page number     |
| &N               | Insert number of pages |
| &D               | Insert date printed    |
| &T               | Insert time printed    |
| &F               | Insert file name       |
| &Z               | Insert file path       |

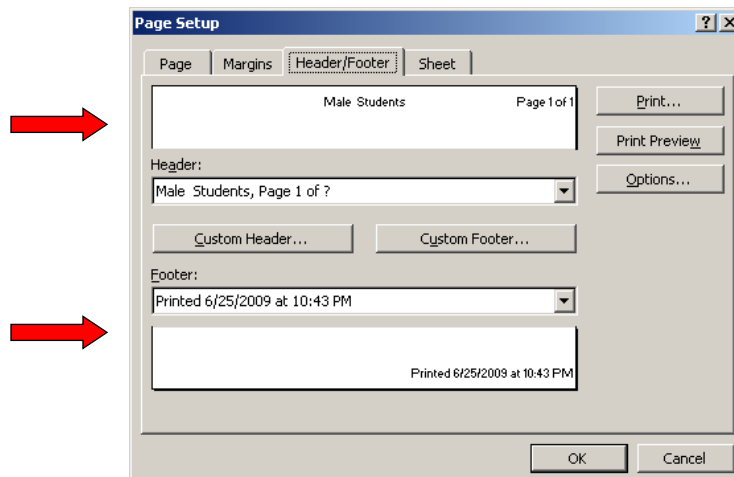
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## Can Also Have Print Headers & Footers

```
ods tagsets.ExcelXP style=sansPrinter file= ... ;
title ...; footnote ...;
* Set some "global" tagset options;
ods tagsets.ExcelXP
  options(embedded_titles='yes'
          embedded_footnotes='yes'
          print_header='&C&A&RPage &P of &N'
          print_footer='&RPrinted &D at &T');
ods tagsets.ExcelXP options(sheet_name=...);
proc print ...; run; quit;
ods tagsets.ExcelXP options(sheet_name=...);
proc print ...; run; quit;
ods tagsets.ExcelXP close;
```

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## Can Also Have Print Headers & Footers



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# AutoFilters

The CLASS Dataset

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alfred  | 14  | 69     | 112.5  |
| Henry   | 14  | 63.5   | 102.5  |
| James   | 12  | 57.3   | 83     |
| Jeffrey | 13  | 62.5   | 84     |
| John    | 12  | 59     | 99.5   |
| Philip  | 16  | 72     | 150    |
| Robert  | 12  | 64.8   | 128    |
| Ronald  | 15  | 67     | 133    |
| Thomas  | 11  | 57.5   | 85     |
| William | 15  | 66.5   | 112    |

(From the SASHELP library)

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# AutoFilters

The CLASS Dataset

| Name    | Age             | Height | Weight |
|---------|-----------------|--------|--------|
| Alfred  | Sort Ascending  | 69     | 112.5  |
| Henry   | Sort Descending | 63.5   | 102.5  |
| James   | (All)           | 57.3   | 83     |
| Jeffrey | (Top 10...)     | 62.5   | 84     |
| John    | (Custom...)     | 59     | 99.5   |
| Philip  | 11              | 72     | 150    |
| Robert  | 12              | 64.8   | 128    |
| Ronald  | 13              | 67     | 133    |
| Thomas  | 14              | 57.5   | 85     |
| William | 15              | 66.5   | 112    |

(From the SASHELP library)

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## AutoFilters

The screenshot shows a Microsoft Excel window titled "MyWorkbook.xml". The spreadsheet contains the following data:

| The CLASS Dataset |     |        |        |
|-------------------|-----|--------|--------|
| Name              | Age | Height | Weight |
| Ronald            | 15  | 67     | 133    |
| William           | 15  | 66.5   | 112    |

Below the data, the text "(From the SASHELP library)" is displayed. The status bar at the bottom indicates "2 of 10 records found" and "NUM".

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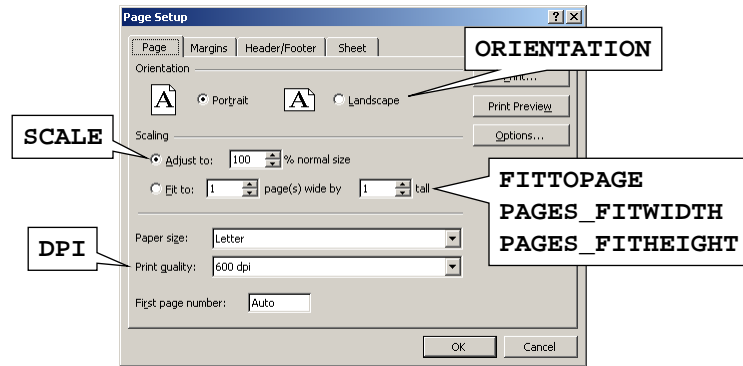
## AutoFilters

```
* Set some "global" tagset options;  
ods tagsets.ExcelXP  
  options(embedded_titles='yes'  
          embedded_footnotes='yes'  
          print_header='&C&A&RPage &P of &N'  
          print_footer='&RPrinted &D at &T'  
          autofilter='2');  
  
ods tagsets.ExcelXP options(sheet_name=...);  
proc print ...; run; quit;  
  
ods tagsets.ExcelXP options(sheet_name=...);  
proc print ...; run; quit;
```

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## Print Options – Page Setup Dialog

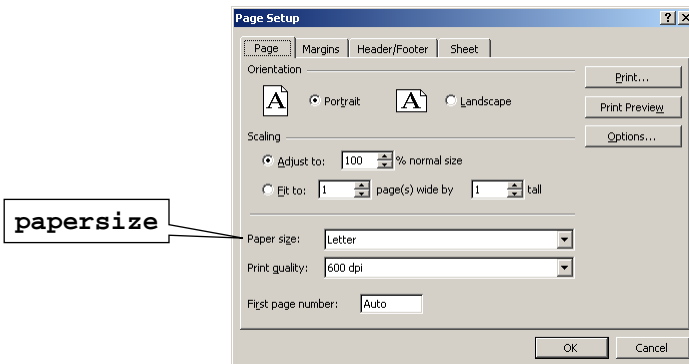
Tagset options



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## Print Options – Page Setup Dialog

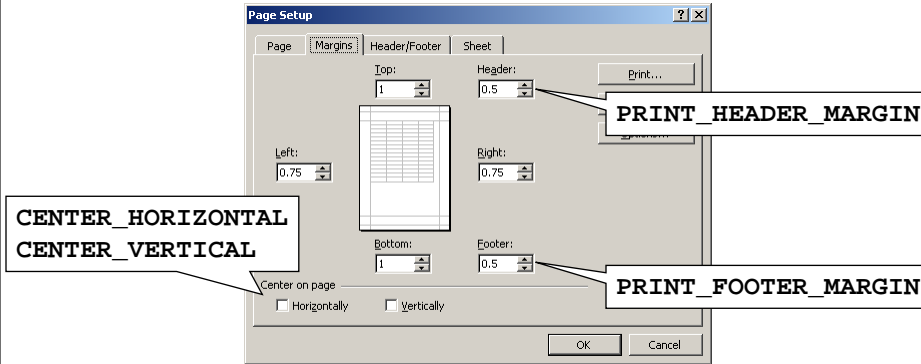
SAS system option, NOT tagset option



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## Print Options – Page Setup Dialog

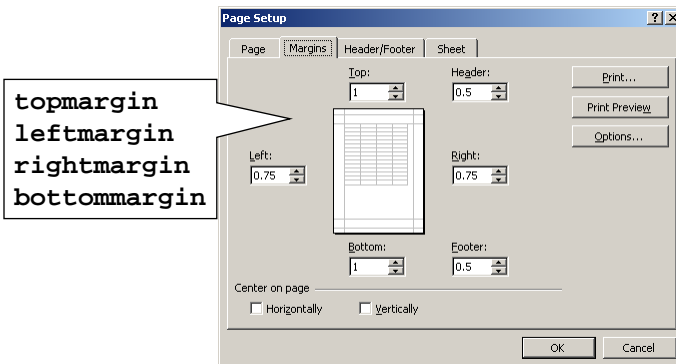
Tagset options



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## Print Options – Page Setup Dialog

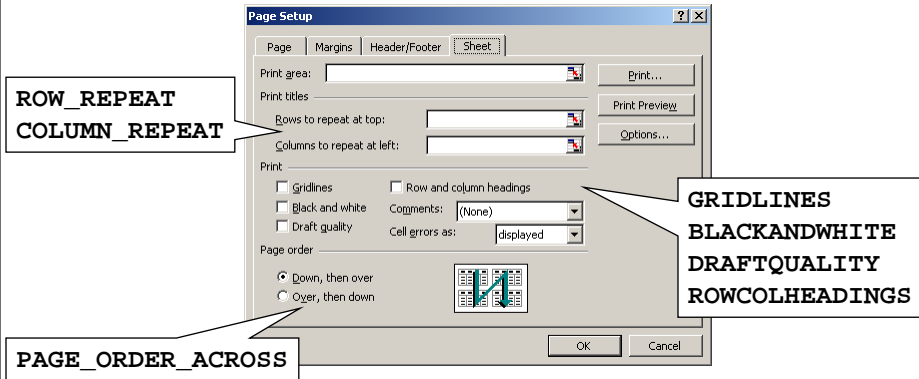
SAS system options, NOT tagset options



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## Print Options – Page Setup Dialog



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## Understanding and Using ODS Style Overrides

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## Changing Display Attributes and Number Formats

- Gender-appropriate background 😊
- 1 decimal place for Height and Weight
- Supported by PRINT, REPORT and TABULATE

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alfred  | 14  | 69.0   | 112.5  |
| Henry   | 14  | 63.5   | 102.5  |
| James   | 12  | 57.3   | 83.0   |
| Jeffrey | 13  | 62.5   | 84.0   |
| John    | 12  | 59.0   | 99.5   |
| Philip  | 16  | 72.0   | 150.0  |
| Robert  | 12  | 64.8   | 128.0  |
| Ronald  | 15  | 67.0   | 133.0  |
| Thomas  | 11  | 57.5   | 85.0   |
| William | 15  | 66.5   | 112.0  |

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alice   | 13  | 56.5   | 84.0   |
| Barbara | 13  | 65.3   | 98.0   |
| Carol   | 14  | 62.8   | 102.5  |
| Jane    | 12  | 59.8   | 84.5   |
| Janet   | 15  | 62.5   | 112.5  |
| Joyce   | 11  | 51.3   | 50.5   |
| Judy    | 14  | 64.3   | 90.0   |
| Louise  | 12  | 56.3   | 77.0   |
| Mary    | 15  | 66.5   | 112.0  |

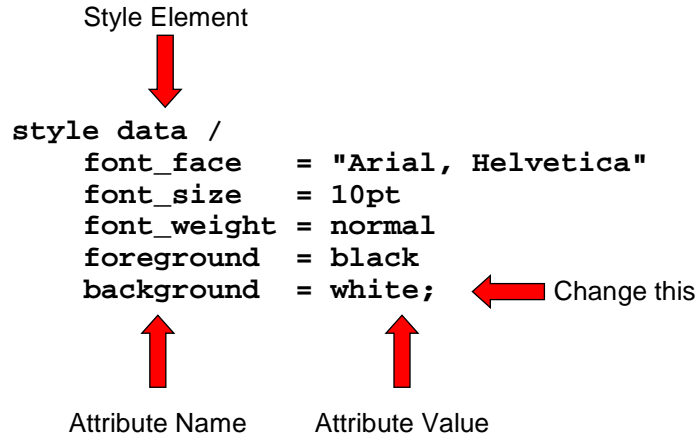
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## Changing Display Attributes and Number Formats

1. Find an ODS style you like
2. Make a copy of the style
3. Change/add style elements/attributes
4. Use the new style elements ("style override")

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## ODS Basics – Anatomy of an ODS Style



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## Default Colors Supported by Excel 2002/2003


|         |  |         |  |         |  |
|---------|--|---------|--|---------|--|
| Black   |  | #333399 |  | #993300 |  |
| #333333 |  | #666699 |  | #993366 |  |
| Gray    |  | Blue    |  | #FF8080 |  |
| #969696 |  | #0066CC |  | #FFCC99 |  |
| Silver  |  | #3366FF |  | #FF99CC |  |
| Teal    |  | #00CCFF |  | Fuchsia |  |
| #003300 |  | #33CCCC |  | Red     |  |
| #333300 |  | Aqua    |  | #FF6600 |  |
| Green   |  | #CCFFFF |  | #FF9900 |  |
| #339966 |  | #99CCFF |  | #FFCC00 |  |
| Olive   |  | #9999FF |  | Yellow  |  |
| #99CC00 |  | #CCCCFF |  | #FFFF99 |  |
| Lime    |  | #CC99FF |  | #FFF999 |  |
| #CCFFCC |  | Purple  |  | #FFF999 |  |
| #003366 |  | #660066 |  | #FFF999 |  |
| Navy    |  | Maroon  |  | White   |  |

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## Make a Copy of the Style

```
proc template;  
  define style styles.XLsansPrinter;  
    parent = styles.sansPrinter;  
  end;  
run; quit;
```

New Style Name



Original Style Name




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## Change/Add Style Elements/Attributes

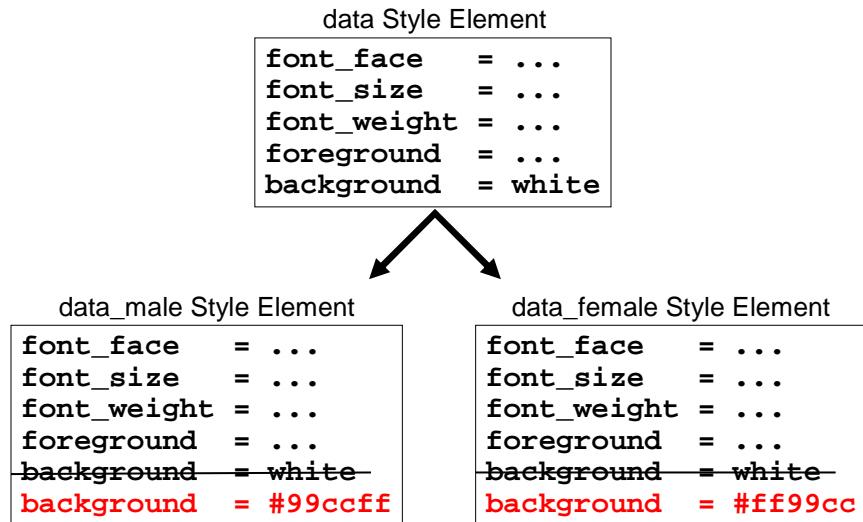
```
proc template;  
  define style styles.XLsansPrinter;  
    parent = styles.sansPrinter;  
    style data_male from data /  
      background=#99ccff;  
    style data_female from data /  
      background=#ff99cc;  
  end;  
run; quit;
```

New style elements (`data_male`, `data_female`) to override an existing attribute (`background`)



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## Child Attributes Inherited from the Parent



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## Use the New Elements – Name & Age Only

```
ods tagsets.ExcelXP style=XLsansPrinter file= ... ;
* Other ODS statements here...
proc print data=sashelp.class noobs;
  where (sex eq 'M');
  var name age / style(Column)=data_male;
  var height weight;
run; quit;

* Other ODS statement here...
proc print data=sashelp.class noobs;
  where (sex eq 'F');
  var name age / style(Column)=data_female;
  var height weight;
run; quit;
ods tagsets.ExcelXP close;
```

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## Use the New Elements – Name & Age Only

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alfred  | 14  | 69     | 112.5  |
| Henry   | 14  | 63.5   | 102.5  |
| James   | 12  | 57.3   | 83     |
| Jeffrey | 13  | 62.5   | 84     |
| John    | 12  | 59     | 99.5   |
| Philip  | 16  | 72     | 150    |
| Robert  | 12  | 64.8   | 128    |
| Ronald  | 15  | 67     | 133    |
| Thomas  | 11  | 57.5   | 85     |
| William | 15  | 66.5   | 112    |

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alice   | 13  | 56.5   | 84     |
| Barbara | 13  | 65.3   | 98     |
| Carol   | 14  | 62.8   | 102.5  |
| Jane    | 12  | 59.8   | 84.5   |
| Janet   | 15  | 62.5   | 112.5  |
| Joyce   | 11  | 51.3   | 50.5   |
| Judy    | 14  | 64.3   | 90     |
| Louise  | 12  | 56.3   | 77     |
| Mary    | 15  | 66.5   | 112    |

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## Change/Add Style Elements/Attributes

```
style data_male from data /  
  background=#99ccff;
```

```
style data_female from data /  
  background=#ff99cc;
```

```
style data_male_d1 from data_male /  
  tagattr='format:#.0';
```

```
style data_female_d1 from data_female /  
  tagattr='format:#.0';
```

New style elements (`data_male_d1`,  
`data_female_d1`) to add a new  
attribute (`tagattr`)

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## Use the New Elements – Height & Weight

```
ods tagsets.ExcelXP style=XLsansPrinter file= ... ;
* Other ODS statements here...

proc print data=sashelp.class noobs;
  where (sex eq 'M');
  var name age / style(Column)=data_male;
  var height weight /
  style(Column)=data_male_d1;
run; quit;

* Other ODS statement here...

proc print data=sashelp.class noobs;
  where (sex eq 'F');
  var name age / style(Column)=data_female;
  var height weight /
  style(Column)=data_female_d1;
run; quit;

ods tagsets.ExcelXP close;
```

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## Use the New Elements

- Gender-appropriate background 😊
- 1 decimal place for Height and Weight
- Supported by PRINT, REPORT and TABULATE

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alfred  | 14  | 69.0   | 112.5  |
| Henry   | 14  | 63.5   | 102.5  |
| James   | 12  | 57.3   | 83.0   |
| Jeffrey | 13  | 62.5   | 84.0   |
| John    | 12  | 59.0   | 99.5   |
| Philip  | 16  | 72.0   | 150.0  |
| Robert  | 12  | 64.8   | 128.0  |
| Ronald  | 15  | 67.0   | 133.0  |
| Thomas  | 11  | 57.5   | 85.0   |
| William | 15  | 66.5   | 112.0  |

| Name    | Age | Height | Weight |
|---------|-----|--------|--------|
| Alice   | 13  | 56.5   | 84.0   |
| Barbara | 13  | 65.3   | 98.0   |
| Carol   | 14  | 62.8   | 102.5  |
| Jane    | 12  | 59.8   | 84.5   |
| Janet   | 15  | 62.5   | 112.5  |
| Joyce   | 11  | 51.3   | 50.5   |
| Judy    | 14  | 64.3   | 90.0   |
| Louise  | 12  | 56.3   | 77.0   |
| Mary    | 15  | 66.5   | 112.0  |


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## More on Excel Formats – Formatting 1/10

| Excel Format | Display Value |
|--------------|---------------|
| 0.0          | 0.1           |
| 0.00         | 0.10          |
| ##           | .1            |
| ###          | .1            |
| #.0          | .1            |

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## More on ExcelXP Tagset Options

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## 2010 Topic – "Automatic" Sheet Names

```
ods tagsets.ExcelXP options(sheet_interval='bygroup'
                             sheet_label='16.2');
```

```
proc report data= ... ;
  by protocol;
  ... ;
run; quit;

... ;
```

ABC 123 or XYZ 987

- BY value of `protocol` used in sheet name
- BY value preceded with "16.2"

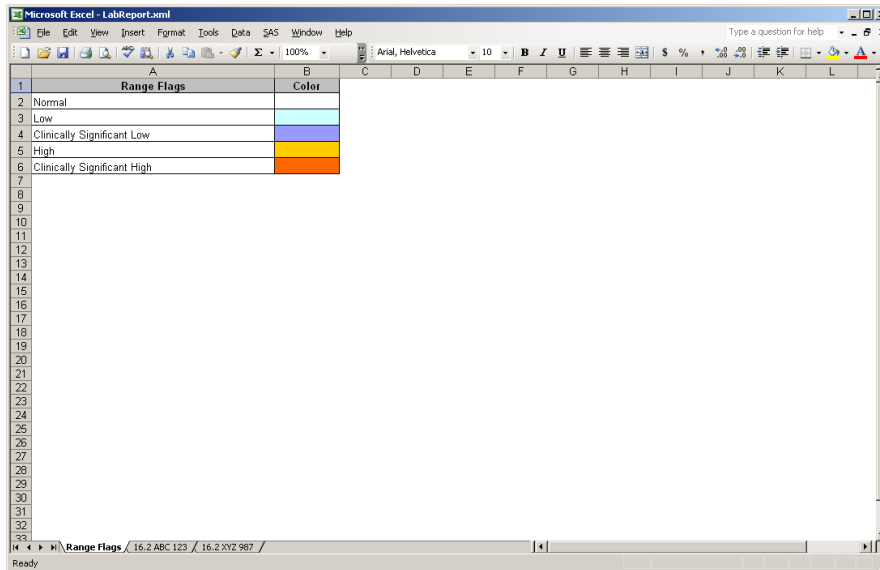
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## 2010 Topic – "Automatic" Sheet Names

| Treatment        | Subject | Lab Site | Visit | Visit Date | Haemoglobin (g/L) | Haematocrit (%) | RBC (x10E12/L) | WBC (x10E9/L) | Abs. Lymphocytes (x10E9/L) | Abs. Monocytes (x10E9/L) |
|------------------|---------|----------|-------|------------|-------------------|-----------------|----------------|---------------|----------------------------|--------------------------|
| Control - Active | 11      | S11      | 1     | 17Jun2001  | 130               | 0.42            | 4              | 6.91          | 3.66                       | 0.124                    |
|                  |         |          | 2     | 19Jun2001  | 140               | 0.42            | 5              | 11.8          | 9.72                       | 0.083                    |
|                  | 13      | G51      | 1     | 08Jun2001  | 130               | 0.36            | 4              | 10            | 6                          | 0.11                     |
|                  |         |          | 2     | 10Jun2001  | 90                | 0.28            | 3              | 6.1           | 3.172                      | 0.061                    |
|                  | 16      | G51      | 1     | 07Jun2001  | 120               | 0.35            | 4              | 7.3           | 4.818                      | 0                        |
|                  |         |          | 2     | 09Jun2001  | 100               | 0.3             | 3              | 8.2           | 5.576                      | 0.082                    |
|                  | 17      | A26      | 1     | 08Jun2001  | 150               | 0.45            | 5              | 11.76         | 8.41                       | 0.09                     |
|                  |         |          | 2     | 10Jun2001  | 130               | 0.4             | 4              | 18.61         | 15.6                       | 0.06                     |
|                  | 22      | G51      | 1     | 10May2001  | 120               | 0.37            | 4              | 5.8           | 3.131                      | 0.116                    |
|                  |         |          | 2     | 12May2001  | 120               | 0.36            | 4              | 5.5           | 3.245                      | 0.11                     |
|                  | 24      | G54      | 1     | 22Apr2001  | 130               | 0.38            | 4              | 10.3          | 2.95                       | 0.954                    |
|                  |         |          | 2     | 24Apr2001  | 120               | 0.35            | 4              | 8.1           | 5.103                      | 0.486                    |
|                  | 32      | A92      | 1     | 21Jul2001  | 140               | 0.41            | 4              | 11            | 5.3                        | 0.2                      |
|                  |         |          | 2     | 23Jul2001  | 140               | 0.42            | 4              | 11.8          | 7.1                        | 0.2                      |
|                  | 36      | A91      | 1     | 26Jun2001  | 140               | 0.41            | 5              | 8.1           | 5.994                      | 0.081                    |
|                  |         |          | 2     | 28Jun2001  | 130               | 0.37            | 4              | 8.7           | 5.915                      | 0.087                    |
|                  | 39      | A92      | 1     | 29Sep2001  | 140               | 0.41            | 4              | 9.4           | 5                          | 0.1                      |
|                  |         |          | 2     | 01Oct2001  | 130               | 0.38            | 4              | 10.3          | 6.9                        | 0.2                      |
|                  | 48      | G51      | 1     | 09Jun2001  | 110               | 0.34            | 4              | 5.6           | 2.656                      | 0.28                     |
|                  |         |          | 2     | 11Jun2001  | 90                | 0.28            | 3              | 9.6           | 7.776                      | 0                        |
|                  |         |          | 1     | 07Sep2001  | 140               | 0.41            | 4              | 7.8           | 4.68                       | 0.078                    |
|                  | 50      | G01      | 1     | 07Sep2001  | 130               | 0.37            | 4              | 12            | 8.64                       | 0                        |
|                  |         |          | 2     | 09Sep2001  | 130               | 0.37            | 4              | 12            | 8.64                       | 0                        |
|                  | 56      | S11      | 1     | 25Aug2001  | 150               | 0.47            | 5              | 7.18          | 4.16                       | 0.416                    |
|                  |         |          | 2     | 27Aug2001  | 130               | 0.42            | 4              | 11            | 8.66                       | 0.11                     |
|                  | 64      | S11      | 1     | 07Sep2001  | 120               | 0.36            | 4              | 3.4           | 1.326                      | 0.066                    |
|                  |         |          | 2     | 09Sep2001  | 100               | 0.3             | 4              | 9.4           | 7.896                      | 0                        |
|                  | 66      | A92      | 1     | 28Jun2001  | 90                | 0.29            | 4              | 5.3           | 2.9                        | 0                        |
|                  |         |          | 2     | 30Jun2001  | 90                | 0.28            | 4              | 5.4           | 3.4                        | 0.1                      |
|                  | 71      | A92      | 1     | 30Jun2001  | 140               | 0.42            | 5              | 7.68          | 4.761                      | 0.076                    |

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## 2010 Topic – "Automatic" Sheet Names



The screenshot shows a Microsoft Excel window titled 'LabReportL.xml'. The spreadsheet has two columns: 'Range Flags' and 'Color'. The data is as follows:

| Range Flags                 | Color |
|-----------------------------|-------|
| Normal                      |       |
| Low                         |       |
| Clinically Significant Low  |       |
| High                        |       |
| Clinically Significant High |       |

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## 2010 Topic – Frozen Headers

```
ods tagsets.ExcelXP options(frozen_headers='yes'  
                           frozen_rowheaders='5');
```

```
proc report data= ... ;  
  by protocol;  
  ... ;  
run; quit;  
... ;
```

- Column headings "frozen" when scrolling
- Row headings (columns 1 – 5) also "frozen"

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## 2010 Topic – Frozen Headers

|     | Haematology |         |          |       |            | Differential               |                          |                            |                            |                          |                     |
|-----|-------------|---------|----------|-------|------------|----------------------------|--------------------------|----------------------------|----------------------------|--------------------------|---------------------|
|     | Treatment   | Subject | Lab Site | Visit | Visit Date | Abs. Lymphocytes (x10E9/L) | Abs. Monocytes (x10E9/L) | Abs. Neutrophils (x10E9/L) | Abs. Eosinophils (x10E9/L) | Abs. Basophils (x10E9/L) | Platelets (x10E9/L) |
| 197 |             | 47      | G51      | 1     | 09Sep2001  | 5.04                       | 0.168                    | 2.436                      | 0.756                      | 0                        | 362                 |
| 198 |             |         |          | 2     | 10Sep2001  | 4.216                      | 0.136                    | 1.904                      | 0.544                      | 0                        | 315                 |
| 199 |             | 53      | A91      | 1     | 01Sep2001  | 6.867                      | 0.101                    | 2.424                      | 0.707                      | 0                        | 310                 |
| 200 |             |         |          | 2     | 03Sep2001  | 6.296                      | 0.084                    | 2.35                       | 0.658                      | 0                        | 277                 |
| 201 |             | 54      | A26      | 1     | 09May2001  | 6.83                       | 0.02                     | 1.22                       | 0.31                       | 0                        | 330                 |
| 202 |             |         |          | 2     | 11May2001  | 5.47                       | 0.15                     | 2.76                       | 0.36                       | 0.03                     | 255                 |
| 203 |             | 57      | A26      | 1     | 17Jun2001  | 3.95                       | 0.12                     | 2.38                       | 0.18                       | 0.01                     | 208                 |
| 204 |             |         |          | 2     | 19Jun2001  | 5.67                       | 0.12                     | 2.03                       | 0.32                       | 0.04                     | 178                 |
| 205 |             | 59      | A92      | 1     | 24Aug2001  | 3.6                        | 0.5                      | 2.2                        | 0.3                        | 0.1                      | 222                 |
| 206 |             |         |          | 2     | 26Aug2001  | 5.8                        | 0.4                      | 2.6                        | 0.3                        | 0.1                      | 243                 |
| 207 |             | 60      | S11      | 1     | 18Jul2001  | 2.95                       | 0.076                    | 2.11                       | 0.333                      | 0.056                    | 276                 |
| 208 |             |         |          | 2     | 21Jul2001  | 10.9                       | 0.013                    | 0.978                      | 0.775                      | 0.013                    | 211                 |
| 209 |             | 67      | G51      | 1     | 14Sep2001  | 9.443                      | 0.133                    | 2.793                      | 0.798                      | 0.133                    | 329                 |
| 210 |             |         |          | 2     | 18Sep2001  | 17.648                     | 0                        | 0.776                      | 0.582                      | 0.194                    | 323                 |
| 211 |             | 68      | G51      | 1     | 04Apr2001  | 7.752                      | 0                        | 2.244                      | 0.204                      | 0.194                    | 233                 |
| 212 |             |         |          | 2     | 06Apr2001  | 10.274                     | 0                        | 2.527                      | 0.389                      | 0                        | 235                 |
| 213 |             | 77      | A26      | 1     | 21Sep2001  | 4.575                      | 0                        | 1.22                       | 0.305                      | 0                        | 226                 |
| 214 |             |         |          | 2     | 23Sep2001  | 5.112                      | 0.144                    | 1.44                       | 0.504                      | 0                        | 237                 |
| 215 |             | 78      | G51      | 1     | 09May2001  | 5.112                      | 0.144                    | 1.44                       | 0.504                      | 0                        | 289                 |
| 216 |             |         |          | 2     | 06May2001  | 4.964                      | 0.068                    | 1.088                      | 0.612                      | 0.068                    | 289                 |
| 217 |             | 96      | G54      | 1     | 21Sep2001  | 4.898                      | 0.395                    | 2.133                      | 0                          | 0.079                    | 271                 |
| 218 |             |         |          | 2     | 26Sep2001  | 12.702                     | 0                        | 1.314                      | 0.146                      | 0                        | 260                 |
| 219 |             | 104     | G54      | 1     | 28Jul2001  | 6.223                      | 0.186                    | 2.046                      | 0.893                      | 0.083                    | 166                 |
| 220 |             |         |          | 2     | 30Jul2001  | 9.76                       | 0                        | 1.708                      | 0.122                      | 0                        | 175                 |
| 221 |             | 108     | A91      | 1     | 05Jul2001  | 2.352                      | 0.196                    | 1.813                      | 0.539                      | 0.049                    | 221                 |
| 222 |             |         |          | 2     | 07Jul2001  | 2.352                      | 0.196                    | 1.813                      | 0.539                      | 0.049                    | 185                 |

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## 2010 Topic – Orientation & Scaling

```
ods tagsets.ExcelXP options(orientation='landscape'
                             scale='70');
```

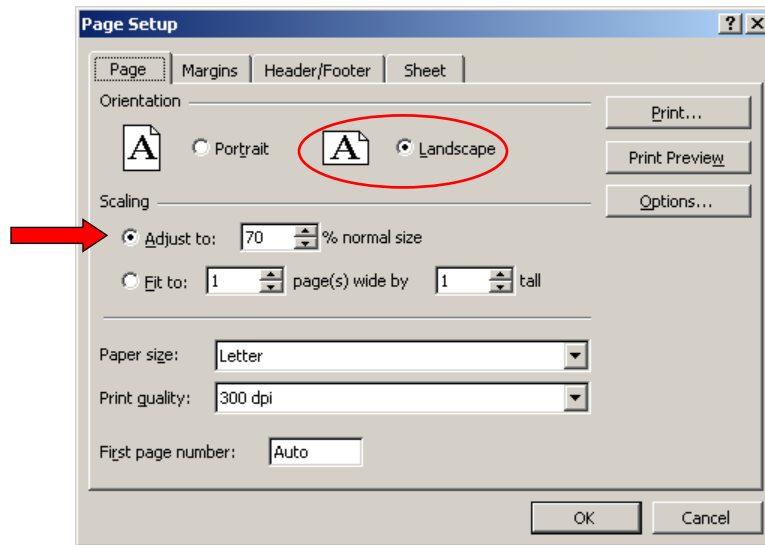
```
proc report data= ... ;
  by protocol;
  ... ;
run; quit;

... ;
```

- Landscape print orientation
- 70% print scaling

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## 2010 Topic – Orientation & Scaling




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More on  
ODS Style Overrides

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## 2010 Topic – Traffic Lighting 101

```
proc print data= ... ;  
  var range;  
  var labflag;   
run; quit;
```

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## 2010 Topic – Traffic Lighting 101

Have:

| Range Flags                 | Color |
|-----------------------------|-------|
| Normal                      | 0     |
| Low                         | 1     |
| Clinically Significant Low  | 3     |
| High                        | 2     |
| Clinically Significant High | 4     |

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## 2010 Topic – Traffic Lighting 101

Want:

| Range Flags                 | Color |
|-----------------------------|-------|
| Normal                      |       |
| Low                         |       |
| Clinically Significant Low  |       |
| High                        |       |
| Clinically Significant High |       |

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## 2010 Topic – Traffic Lighting 101

```
❶ proc format;
  value labflag 0 = 'white'
                1 = '#CCFFFF'
                3 = '#9999FF'
                2 = '#FFCC00'
                4 = '#FF6600';

run; quit;

proc print data= ... ;
  var range;
❷ var labflag / style(Column)=[background=labflag.];
run; quit;
```



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## 2010 Topic – Traffic Lighting 101

| Range Flags                 | Color |
|-----------------------------|-------|
| Normal                      | 0     |
| Low                         | 1     |
| Clinically Significant Low  | 3     |
| High                        | 2     |
| Clinically Significant High | 4     |


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## 2010 Topic – Traffic Lighting 101

```
proc format;
  value labflag 0 = 'white'
                1 = '#CCFFFF'
                3 = '#9999FF'
                2 = '#FFCC00'
                4 = '#FF6600';

run; quit;

proc print data= ... ;
  var range;
  var labflag / style(Column)=[background=labflag.
  ③ foreground=labflag.];
run; quit;
```



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## 2010 Topic – Traffic Lighting 101

| Range Flags                 | Color |
|-----------------------------|-------|
| Normal                      |       |
| Low                         |       |
| Clinically Significant Low  |       |
| High                        |       |
| Clinically Significant High |       |

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## 2010 Topic – Traffic Lighting 201

| Treatment        | Subject | Lab Site | Visit | Visit Date | Haemoglobin (g/L) | Haematocrit (%) | RBC | Abs. Lymphocytes (x10E9/L) | Abs. Monocytes (x10E9/L) |       |
|------------------|---------|----------|-------|------------|-------------------|-----------------|-----|----------------------------|--------------------------|-------|
| Control - Active | 11      | S11      | 1     | 17Jun2001  | 130               | 0.41            | 4   | 3.66                       | 0.124                    |       |
|                  | 13      | G51      | 1     | 19Jun2001  | 140               | 0.39            | 4   | 9.72                       | 0.083                    |       |
|                  |         |          | 2     | 08Jun2001  |                   |                 |     | 6                          | 0.1                      |       |
|                  |         |          | 2     | 10Jun2001  |                   |                 |     | 3.172                      | 0.061                    |       |
|                  | 16      | G51      | 1     | 09Jun2001  | 130               | 0.41            | 4   | 7.3                        | 4.818                    | 0     |
|                  |         |          | 2     | 09Jun2001  | 130               | 0.41            | 4   | 8.2                        | 5.576                    | 0.082 |
|                  | 17      | A92      | 1     | 09Jun2001  | 130               | 0.41            | 4   | 11.76                      | 8.41                     | 0.09  |
|                  |         |          | 2     | 09Jun2001  | 130               | 0.41            | 4   | 18.61                      | 15.6                     | 0.06  |
|                  |         |          | 2     | 11Jun2001  | 90                | 0.28            | 3   | 9.6                        | 7.778                    | 0     |
|                  |         |          | 2     | 23Jul2001  | 140               | 0.42            | 4   | 11.8                       | 7.1                      | 0.2   |
|                  | 31      | A91      | 1     | 26Jul2001  | 140               | 0.41            | 5   | 8.1                        | 5.994                    | 0.081 |
|                  |         |          | 2     | 28Jul2001  | 130               | 0.37            | 4   | 8.7                        | 5.915                    | 0.087 |
|                  | 39      | A92      | 1     | 29Sep2001  | 140               | 0.41            | 4   | 9.4                        | 5                        | 0.1   |
|                  |         |          | 2     | 01Oct2001  | 130               | 0.38            | 4   | 10.3                       | 6.9                      | 0.2   |
|                  | 48      | G51      | 1     | 09Jun2001  | 110               | 0.34            | 4   | 5.6                        | 2.856                    | 0.28  |
|                  |         |          | 2     | 11Jun2001  | 90                | 0.28            | 3   | 9.6                        | 7.778                    | 0     |
|                  | 50      | G01      | 1     | 07Sep2001  | 140               | 0.41            | 4   | 7.8                        | 4.68                     | 0.078 |
|                  |         |          | 2     | 09Sep2001  | 130               | 0.37            | 4   | 12                         | 8.64                     | 0     |
|                  | 56      | S11      | 1     | 25Aug2001  | 150               | 0.47            | 5   | 7.18                       | 4.16                     | 0.416 |
|                  |         |          | 2     | 27Aug2001  | 130               | 0.42            | 4   | 11                         | 8.66                     | 0.11  |
|                  | 64      | S11      | 1     | 07Sep2001  | 120               | 0.36            | 4   | 3.4                        | 1.326                    | 0.058 |
|                  |         |          | 2     | 09Sep2001  | 100               | 0.3             | 4   | 9.4                        | 7.896                    | 0     |
|                  | 66      | A92      | 1     | 28Jul2001  | 90                | 0.29            | 4   | 5.3                        | 2.9                      | 0.2   |
|                  |         |          | 2     | 30Jul2001  | 90                | 0.28            | 4   | 5.4                        | 3.4                      | 0.1   |
|                  | 71      | A92      | 1     | 20Jun2001  | 140               | 0.41            | 5   | 7.68                       | 4.761                    | 0.077 |

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## Conclusion

- Use ExcelXP tagset to create XML file
- Resulting XML file can be viewed with Excel
- Make use of tagset options
- Apply ODS style overrides carefully
- Use Excel formats instead of SAS formats

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## Resources

- "An Introduction to Creating Multi-Sheet Microsoft Excel Workbooks the Easy Way with SAS"  
<http://www.sas.com/reg/gen/corp/867226?page=Resources>  
(Ignore wrapping in above URL)
- "Reporting Procedure Styles Tip Sheet"  
[support.sas.com/rnd/base/ods/scratch/reporting-styles-tips.pdf](http://support.sas.com/rnd/base/ods/scratch/reporting-styles-tips.pdf)  
(Ignore wrapping in above URL)

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