



Description: This document describes how to create a Pivot Table and connect it to Excel data inside a ReportWorx Excel template.

This document gives also some information and tips on how to implement subtotals for certain groups of data through query language, and how to highlight certain Excel cells to create alternate rows or to underline special rows.

OS Requirement: The operating system required is Windows XP/2000/2003.

General Requirement: Medium Knowledge of Excel.

Using Pivot Table

Pivot Tables are a very useful Excel tool which allow you to aggregate data according to groups and have a summarizing function like sum, count, average, max, min, product etc. on one data field for each group created. A Pivot table may then be used, for instance, in the case you want subtotals for each accounting department, and then for each sales person.

Using ReportWorx Wizard

Let's go ahead with one practical example, which involves the usage of some tables in the NorthWind database and the SQL Wizard tool of the ReportWorx configurator.

The same logic goes for other kinds of Databases.

1. Create a new template inside the ReportWorx configurator and then open it in order to configure it.
2. Right click on a group of cells (1 row by 4 column s) and then right click to and select **Configure Group > Open Database >MS SQL Server (native)** (you can use other kinds of connection of course).
3. **DATABASE LOGIN:** connect then to the NorthWind database.
4. **DATA SELECTION:** click on **DATA Selection>Advanced Configuration Mode>SQL Query Wizard**. Use **Add/Remove Tables** button to select tables from the database and the fields you need. In our example select the table Invoices and fields Country, Sales Person, OrderDate and ExtendedPrice.

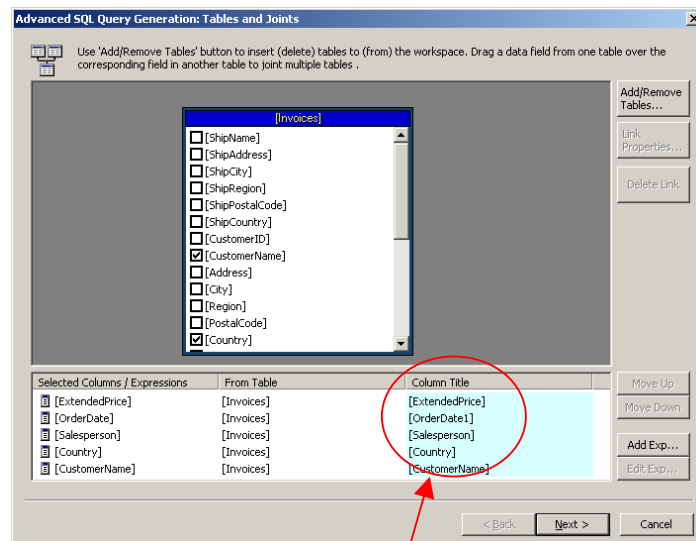


Figure 1: SQL Query Wizard data selection

If you want, you can modify the default column titles by editing the **Column Title**.

Then click Ok.

Click next until finish.

5. **DATABASE MAPPING:** click on the **DATABASE MAPPING** button; check the **Auto Expand** option and the option **Reserve top row of cells as column headers**. This latter option is very important in this case because it will automatically give the titles to the just configured columns. If you want, you can modify the column titles by editing the **Header Text** part in the **Data Mapping** dialog. Then click Ok.

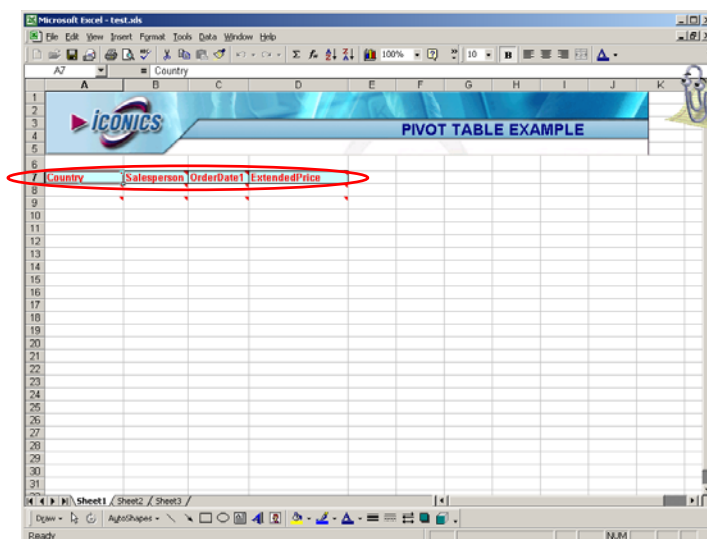


Figure 2: Column Configured in the Template



6. **INSERT A PIVOT TABLE** - Now insert a Pivot table in the Excel template where you like the most: I will use a different worksheet to have a better view. Go to **DATA>Pivot table** in the Excel menu
The following window will pop up:

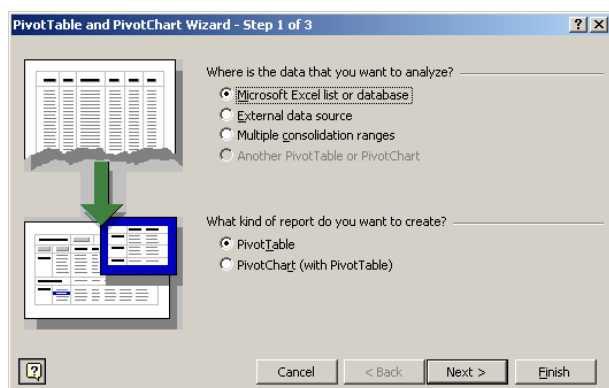


Figure 3: Pivot Table Wizard Window - step1

Check the **Microsoft Excel list or database** option and click the **Next** button.

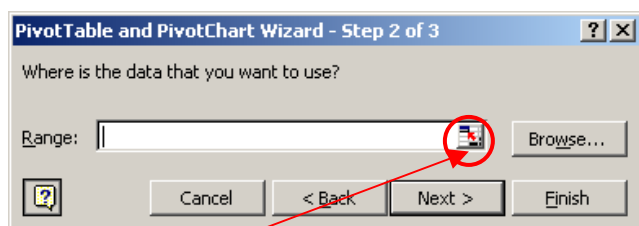
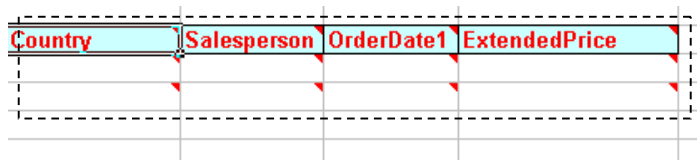


Figure 4: Pivot Table Wizard Window - step2

Click on the range selection tool and then select the entire cells group we configured previously (3 rows by 4 columns)



Click **Next** Button to go to step 3 of the Pivot Table Wizard.

7. Click on **Layout** button in the 3rd step of the Pivot table Wizard and arrange the column fields as shown in the figure 5, choosing **Sum** function to aggregate "ExtendedPrice" data. Then Click Ok and Finish. You can always access to Pivot Table Wizard settings through the Pivot Table **Toolbar** by clicking on **Pivot Table > Wizard** (if the toolbar is not visible, click

anywhere on the Pivot Table and then go to **Data>Pivot table and Pivot Chart Report** in the Excel menu and then click just **Finish** button).

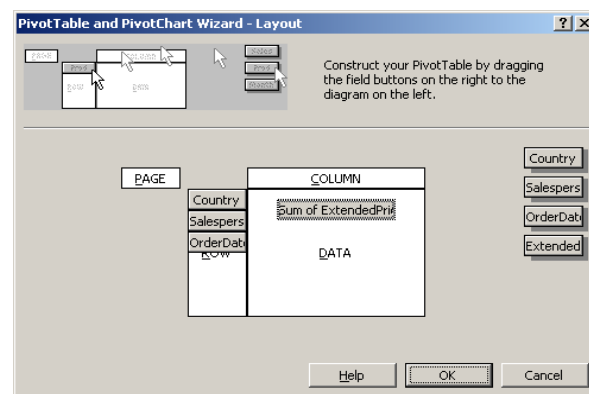


Figure 5: Pivot Table Wizard Window - step3 Layout

You can format the Pivot Table by right clicking on it and selecting **Format Report** item. Here is how the pivot table looks after choosing **Report 4** from the **AutoFormat** Dialog:

1				
2				
3	Country	Salesp.	OrderDate1	ExtendedPrice
4	(blank)			
5		(blank)		
6			(blank)	
7		(blank)	Total	
8				
9	(blank)	Total		
10				
11	Grand Total			
12				
13				
14				
15				
16				
17				
18				
19				
20				

Figure 6: Pivot Table inserted in the Excel template

8. **REFRESH PIVOT TABLE VALUES**- the pivot table is now empty because the excel data range it is associated with, isn't populated yet. After ReportWorx executes the report, the data will be updated in the Excel range. The Pivot table has the option of **Refresh on open** available in the table options Window by right clicking on the table and selecting **Table Options**. **DO NOT CHECK THIS OPTION** to refresh the table: it will cause conflict with the ReportWorx updating the configured cells content.
To achieve the automatic table refresh, instead, open the Visual Basic Editor in Excel (**Tool>Macro>Visual Basic Editor**):



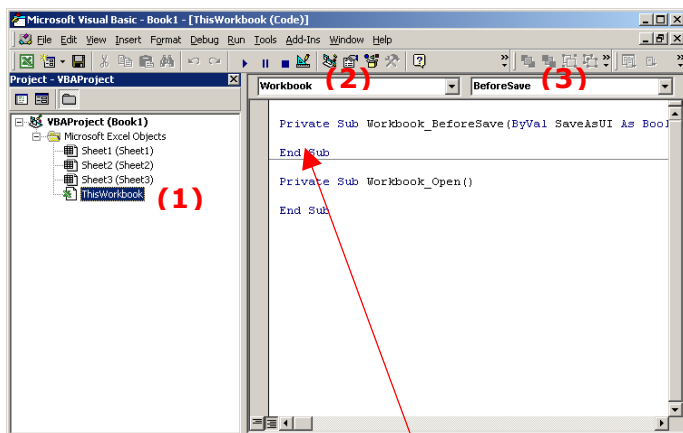
ReportWorX.NET Working with Pivot Tables & More

APPLICATIONS NOTE

June 2003



- If the Project Explorer Window is not open, open it by clicking on the VBA Editor Main Menu: **View>Project Explorer**. A dockable window with title **Project-VbaProject** will be shown (1).
- The Project Explorer lists all the Excel objects available in the workbook (sheet1, sheet2, etc. and thisWorkbook). Double click on **thisWorkbook** to access the Editing Window on the right related to this object.
- Go to the editing Window on the top left drop down list and select **Workbook** (by default it should be **General**)(2).
- Go to the top right drop down list and select **BeforeSave** event: a function triggered on this event will be written down for you (3).



- Paste the following command inside this function (just in the line before the **End Sub** statement):

ThisWorkbook.RefreshAll

This code will refresh the Pivot table after the ReportWorX has updated the data.

- Save the code and close the VBA Editor

9. **SAVE THE TEMPLATE AND RUN THE REPORT**- after running the report, here are the result you get:

Country	Salesperson	OrderDate	ExtendedPrice
France	Steven Buchan	7/4/1996	169
France	Steven Buchan	7/4/1996	99
France	Steven Buchan	7/4/1996	174
Germany	Michael Suyar	7/5/1996	167.4
Germany	Michael Suyar	7/5/1996	1696
Brazil	Margaret Peac	7/6/1996	77
Brazil	Margaret Peac	7/6/1996	1261.4
France	Janet Leverling	7/6/1996	214.2
France	Janet Leverling	7/6/1996	95.76
France	Janet Leverling	7/6/1996	222.3
France	Janet Leverling	7/6/1996	336
Belgium	Margaret Peac	7/6/1996	2462.4
Belgium	Margaret Peac	7/6/1996	47.5
Brazil	Margaret Peac	7/6/1996	1000
Brazil	Janet Leverling	7/10/1996	200
Brazil	Janet Leverling	7/10/1996	604.8
Brazil	Janet Leverling	7/10/1996	640
Switzerland	Steven Buchan	7/11/1996	45.9
Switzerland	Steven Buchan	7/11/1996	342.72
Switzerland	Steven Buchan	7/11/1996	166
Switzerland	Anne Dodsworth	7/12/1996	304
Switzerland	Anne Dodsworth	7/12/1996	486.5
Switzerland	Anne Dodsworth	7/12/1996	380
Switzerland	Anne Dodsworth	7/12/1996	1320

Country	Salesperson	OrderDate	ExtendedPrice
France	Steven Buchanan	7/4/1996	\$440.00
France	Steven Buchanan	9/4/1996	\$1,430.00
France	Steven Buchanan	11/20/1996	\$429.40
France	Steven Buchanan	11/5/1997	\$484.25
France	Steven Buchanan	4/22/1998	\$210.00
France	Steven Buchanan Total		\$2,993.65
Germany	Michael Suyama	8/6/1996	\$538.60
Germany	Michael Suyama	11/11/1996	\$642.06
Germany	Michael Suyama	1/24/1997	\$360.00
Germany	Michael Suyama	3/20/1997	\$756.00
Germany	Michael Suyama	4/9/1997	\$523.25
Germany	Michael Suyama	6/5/1997	\$520.41
Germany	Michael Suyama	1/12/1998	\$730.00
Germany	Michael Suyama	2/25/1998	\$100.50
Germany	Michael Suyama	3/24/1998	\$291.55
Germany	Michael Suyama Total		\$4,470.38
Brazil	Margaret Peacock	11/22/1996	\$7,390.20
Brazil	Margaret Peacock	2/21/1997	\$331.20
Brazil	Margaret Peacock	2/21/1997	\$1,829.20
Brazil	Margaret Peacock	3/11/1997	\$1,820.00
Brazil	Margaret Peacock	4/2/1997	\$600.40

Figure 7: Data and Pivot Table after the report was executed

All the data are grouped by Country, then by Salesperson and by OrderDate; for each group and sub group you have the total of the ExtendedPrice data, which is the price for the orders.

Writing the query manually

If you want to manually write your query instead of using the wizard, and if in the **DATA MAPPING** part of the configuration Dialog you JUST check the option **Reserve the top row as column headers**, generic names would be given to the columns header like FIELD1, FIELD2, FIELD3 etc.

These names will be then replaced during the execution of the report with the alias names given in the query (ex. SELECT filed1 as AliasName FROM, etc.).

Example: Configure again some Excel cell to be connected to NorthWind Database using for instance open database connection to SQL server, and write the following query using **Data Selection>advanced configuration mode> edit SQL manually**



SELECT

Invoices.Country AS **MyCountryTitle**,
Invoices.Salesperson AS **MySalespersonTitle**,
Invoices.OrderDate AS **MyOrderDateTitle**,
Invoices.ExtendedPrice AS **MyExtendedPriceTitle**

FROM

Invoices

If we just reserve the top row as column header in the Data Mapping part, the configurator will write “filed1”, “filed2”, “filed3” and “filed4” as column headers. During the report execution, these titles will be replaced with the names given in the query (MyCountryTitle, MySalespersonTitle etc.) and the pivot table will have wrong references!

In this case, you have two options:

- 1) Check the option **Reserve the top row as column headers** in the **Data Mapping** Dialog AND write ALL the correct titles in the most right column, **Header Text**

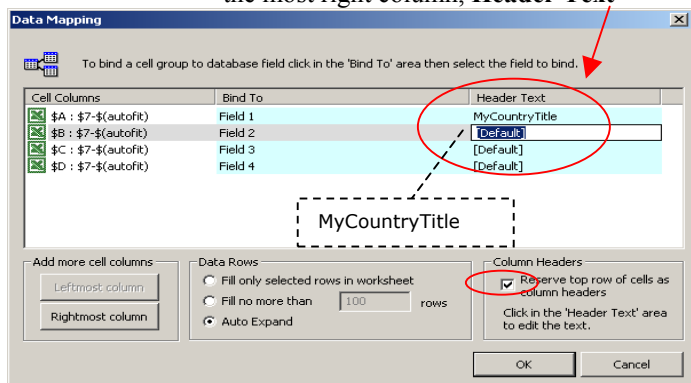


Figure 8: Configurator Data Mapping Dialog

- 2) Then Click **Ok**. Don't check the option **Reserve the top row as column headers** in the **Data Mapping**, click **Ok** AND write the right column titles in the headers directly at the top row of the configured cells:

6				
7	MyCountryTitle	MySalesPersonTitle	MyOrderDateTitle	MyExtendedPriceTitle
8				
9				
10				
11				

Figure 9: Group of configured cells

At this point, follow the steps to create a pivot table as explained in the previous case and connect it to this range of cells.

Implementing Subtotals through Query Language

Now let's go over the topic of creating subtotals using SQL query language.

In the example we saw before, when discussing how to use the pivot table, we didn't need to do any particular grouping of the data: we just selected some tables and the relative data fields we wanted to see in the Excel report. The pivot table automatically creates groups and subtotals for each of them, according its layout settings.

Another method for showing groups and subtotals for each group is to use the query language to do that.

The following example uses the same table and fields used in the previous chapter.

1. Create a new template inside the ReportWorX configurator and then open it in order to configure it.
2. Right click on a group of cells (1 row by 4 column s) and then right click to and select **Configure Group > Open Database >MS SQL Server (native)** (you can use other kind connection of course).
3. **DATABASE LOGIN:** connect then to the NorthWind database.
4. **DATA SELECTION:** click on **DATA Selection>Advanced Configuration Mode>edit Sql Manually** (or you can use the wizard to create the basic query to select the tables and data fields and then modify it manually).
5. Write the following query:

SELECT

Invoices.Country AS MyCountryTitle,
Invoices.Salesperson AS MySalespersonTitle,
Invoices.OrderDate AS MyOrderDateTitle,
Sum (Invoices.ExtendedPrice) AS MyExtendedPriceTitle
FROM
Invoices

Group By Country,Salesperson,OrderDate with Rollup

In this query the key function are **Sum** and **Group By** as long as **with Rollup**:

The rollup function detects each subgroup in the group by clause. When a group is found, the aggregate function (sum in our case) is applied. In this way we can calculate subtotals for each subgroups, and the grand totals for all the records.

You can add also at the end the **Order By** clause to the query.



Here are the records after running the report:

MyCountryTitle	MySalespersonTitle	MyOrderDateTitle	MyExtendedPriceTitle
Argentina	Andrew Fuller	1/7/1998	\$477.00
Argentina	Andrew Fuller		\$477.00
Argentina	Anne Dodsworth	12/17/1997	\$12.50
Argentina	Anne Dodsworth	1/13/1998	\$932.00
Argentina	Anne Dodsworth		\$944.50
Argentina	Janet Leverling	1/9/1997	\$319.20
Argentina	Janet Leverling		\$319.20
Argentina	Laura Callahan	4/29/1997	\$225.50
Argentina	Laura Callahan	3/30/1998	\$2,220.00
Argentina	Laura Callahan	4/28/1998	\$305.00
Argentina	Laura Callahan		\$2,750.50
Argentina	Margaret Peacock	2/17/1997	\$443.40
Argentina	Margaret Peacock	10/24/1997	\$706.00
Argentina	Margaret Peacock	2/11/1998	\$150.00
Argentina	Margaret Peacock	2/20/1998	\$30.00
Argentina	Margaret Peacock		\$1,329.40
Argentina	Michael Suyama	4/13/1998	\$76.00
Argentina	Michael Suyama		\$76.00
Argentina	Nancy Davolio	2/27/1998	\$686.70
Argentina	Nancy Davolio		\$686.70
Argentina	Robert King	5/8/1997	\$110.00
Argentina	Robert King	3/10/1998	\$644.80
Argentina	Robert King	3/18/1998	\$781.00
Argentina	Robert King		\$1,535.80
Argentina			\$8,119.10
Austria	Andrew Fuller	11/29/1996	\$1,689.78
Austria	Andrew Fuller	12/24/1996	\$1,440.00

Figure 9: result of the query with rollup function

As you can see, the records have been grouped according the country values, then according the sales person and then according the Order date. For each group there is a line showing the sum of the "ExtendedPrice".

6. If you want data grouped according to a different grouping level (ex. you want to group first by sales person and then by country), you just need to list the field in the Group by clause accordingly:

Group By Salesperson, Country, OrderDate with Rollup

7. If you want to have more than one data field visualized, but you don't want subtotals for each possible combination of subgroups, you need to restrict the rows returned after grouping in order to discard the subgroups you don't need. This option is not available using pivot table where you can't both show fields and not having subgroups for each of them. Let's say, you want to see subtotals for group of countries only; in this case the query becomes:

SELECT

Invoices.Country AS MyCountryTitle,
Invoices.Salesperson AS MySalespersonTitle,
Invoices.OrderDate AS MyOrderDateTitle,
Sum (Invoices.ExtendedPrice) AS MyExtendedPriceTitle

FROM

Invoices

Group By Country,Salesperson,OrderDate with Rollup

HAVING Invoices.Salesperson is Null or Invoices.OrderDate is not Null

The filtering is done by the Where clause, the logic used is: Retrieve in the Group by clause the field name that follows the fields you want to group and the latest field. Build a condition in the where clause to take the records which have either first field null or the second one not null. This query will show subtotals only relative to countries grouping:

MyCountryTitle	MySalespersonTitle	MyOrderDateTitle	MyExtendedPriceTitle
Argentina	Andrew Fuller	1/7/1998	\$477.00
Argentina	Anne Dodsworth	12/17/1997	\$12.50
Argentina	Anne Dodsworth	1/13/1998	\$932.00
Argentina	Janet Leverling	1/9/1997	\$319.20
Argentina	Laura Callahan	4/29/1997	\$225.50
Argentina	Laura Callahan	3/30/1998	\$2,220.00
Argentina	Laura Callahan	4/28/1998	\$305.00
Argentina	Margaret Peacock	2/17/1997	\$443.40
Argentina	Margaret Peacock	10/24/1997	\$706.00
Argentina	Margaret Peacock	2/11/1998	\$150.00
Argentina	Margaret Peacock	2/20/1998	\$30.00
Argentina	Michael Suyama	4/13/1998	\$76.00
Argentina	Nancy Davolio	2/27/1998	\$686.70
Argentina	Robert King	5/8/1997	\$110.00
Argentina	Robert King	3/10/1998	\$644.80
Argentina	Robert King	3/18/1998	\$781.00
Argentina			\$8,119.10
Austria	Andrew Fuller	11/29/1996	\$1,689.78
Austria	Andrew Fuller	12/24/1996	\$1,440.00
Austria	Andrew Fuller	7/10/1997	\$4,725.00

Figure 10: result of the query with rollup function plus filterings



Highlighting cells in Excel template

It may be useful to highlight some rows in Excel to differentiate them among others, or just to create a finer layout. Let's go over some useful cases.

Create alternate rows

If you configure a group of EXCEL cells, and you choose the **auto Expand** option in the DATA MAPPING part of the Configuration, you don't know how many row are going to be populated so you can't format the cell rows in advance to be colored alternatively.

In this case we can use the Excel tool **Conditional Formatting**:

1. Select the configured cell groups

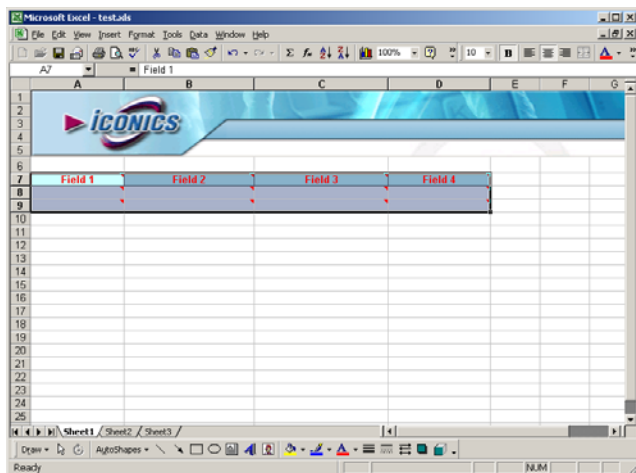


Figure 11: configured cell selected

2. Select **Format>Conditional Formatting** in the Excel menu ; a dialog will pop up: choose **Formula is** and write the following formula
 $\text{=MOD}(\text{ROW}(), 2)=0$
For even row colored or
 $\text{=MOD}(\text{ROW}(), 1)=0$

For odd row colored

Then click the format button in the dialog to choose your settings for the cell to be applied when the condition become true.

MyCountryTitle	MySalespersonTitle	MyOrderDateTitle	MyExtendedPriceTitle
Argentina	Andrew Fuller	1/7/1998	\$477.00
Argentina	Anne Dodsworth	12/17/1997	\$12.50
Argentina	Anne Dodsworth	1/13/1998	\$932.00
Argentina	Janet Leverling	1/9/1997	\$319.20
Argentina	Laura Callahan	4/29/1997	\$225.50
Argentina	Laura Callahan	3/30/1998	\$2,220.00
Argentina	Laura Callahan	4/28/1998	\$305.00
Argentina	Margaret Peacock	2/17/1997	\$443.40
Argentina	Margaret Peacock	10/24/1997	\$706.00
Argentina	Margaret Peacock	2/11/1998	\$150.00
Argentina	Margaret Peacock	2/20/1998	\$30.00
Argentina	Michael Suyama	4/13/1998	\$76.00
Argentina	Nancy Davolio	2/27/1998	\$686.70
Argentina	Robert King	5/6/1997	\$110.00
Argentina	Robert King	3/10/1998	\$644.80
Argentina	Robert King	3/18/1998	\$781.00
Argentina			\$8,119.10
Austria	Andrew Fuller	11/29/1996	\$1,689.78
Austria	Andrew Fuller	12/24/1996	\$1,440.00
Austria	Andrew Fuller	7/10/1997	\$4,725.00
Austria	Andrew Fuller	9/30/1997	\$1,404.45
Austria	Andrew Fuller	4/11/1998	\$4,288.85

Figure 12: alternate rows created using conditional formatting

Tips on highlighting subtotal rows

We have seen how to create subtotals using query language. It would be very useful to highlight the rows reporting the subtotals to have a better formatting of our data. Let's refer to the same example we used to show how to create subtotals for just one group (figure 10):

MyCountryTitle	MySalespersonTitle	MyOrderDateTitle	MyExtendedPriceTitle
Argentina	Andrew Fuller	1/7/1998	\$477.00
Argentina	Anne Dodsworth	12/17/1997	\$12.50
Argentina	Anne Dodsworth	1/13/1998	\$932.00
Argentina	Janet Leverling	1/9/1997	\$319.20
Argentina	Laura Callahan	4/29/1997	\$225.50
Argentina	Laura Callahan	3/30/1998	\$2,220.00
Argentina	Laura Callahan	4/28/1998	\$305.00
Argentina	Margaret Peacock	2/17/1997	\$443.40
Argentina	Margaret Peacock	10/24/1997	\$706.00
Argentina	Margaret Peacock	2/11/1998	\$150.00
Argentina	Margaret Peacock	2/20/1998	\$30.00
Argentina	Michael Suyama	4/13/1998	\$76.00
Argentina	Nancy Davolio	2/27/1998	\$686.70
Argentina	Robert King	5/6/1997	\$110.00
Argentina	Robert King	3/10/1998	\$644.80
Argentina	Robert King	3/18/1998	\$781.00
Argentina			\$8,119.10
Austria	Andrew Fuller	11/29/1996	\$1,689.78
Austria	Andrew Fuller	12/24/1996	\$1,440.00

Here is one row reporting a subtotal. We can again use the conditional formatting of Excel to achieve our goal.



If you observe the rows with subtotal, in this case there are always two values to null: MysalespersonTitle and MyOrderDateTitle. Let's pick one of them, MysalespersonTitle and the relative column B.

1. Select the configured cell groups as in figure 11.
3. Select **Format>Conditional Formatting** in the Excel menu; choose **Formula is** and write the following formula which uses relative reference on the number of row:
`=ISBLANK($B7)`

Where

- B is the column associated to the MysalespersonTitle, which shows blank value in the rows with subtotals
- 7 is the row number of the first configured group cells (this is not a fixed reference because it doesn't have \$ in front of it, so it will be "relatively" changed by Excel while going through the cell group to format them). Then set the format settings you like.

Here is the result:

MyCountryTitle	MySalespersonTitle	MyOrderDateTitle	MyExtendedPriceTitle
Argentina	Andrew Fuller	1/7/1998	\$477.00
Argentina	Andrew Fuller		\$477.00
Argentina	Anne Dodsworth	12/17/1997	\$12.50
Argentina	Anne Dodsworth	1/13/1998	\$932.00
Argentina	Anne Dodsworth		\$944.50
Argentina	Janet Leverling	1/9/1997	\$319.20
Argentina	Janet Leverling		\$319.20
Argentina	Laura Callahan	4/29/1997	\$225.50
Argentina	Laura Callahan	3/30/1998	\$2,220.00
Argentina	Laura Callahan	4/28/1998	\$305.00
Argentina	Laura Callahan		\$2,750.50
Argentina	Margaret Peacock	2/17/1997	\$443.40
Argentina	Margaret Peacock	10/24/1997	\$706.00
Argentina	Margaret Peacock	2/11/1998	\$150.00
Argentina	Margaret Peacock	2/20/1998	\$30.00
Argentina	Margaret Peacock		\$1,329.40
Argentina	Michael Suyama	4/13/1998	\$76.00
Argentina	Michael Suyama		\$76.00
Argentina	Nancy Davolio	2/27/1998	\$686.70
Argentina	Nancy Davolio		\$686.70
Argentina	Robert King	5/8/1997	\$110.00
Argentina	Robert King	3/10/1998	\$644.80
Argentina	Robert King	3/18/1998	\$781.00
Argentina	Robert King		\$1,535.80
Argentina			\$8,119.10
Austria	Andrew Fuller	11/29/1996	\$1,689.78
Austria	Andrew Fuller	12/24/1996	\$1,440.00

Figure 13: lightening of subtotal rows using conditional formatting

If you want to have more subgroups, and have different highlightenings for groups of different level you may use the following formulas:

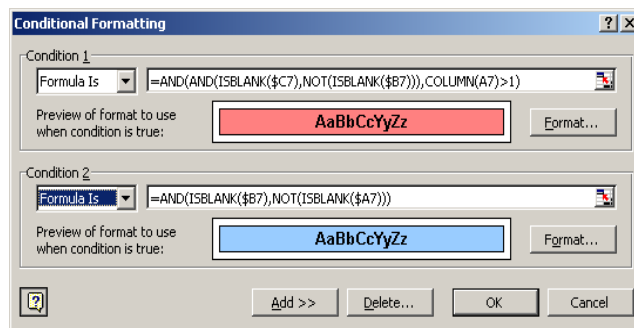


Figure 14: Excel conditional formatting dialog

Condition 1:

`=AND(AND(ISBLANK($C7),NOT(ISBLANK($B7))),COLUMN(A7)>1)`

Condition 2:

`=AND(ISBLANK($B7),NOT(ISBLANK($A7)))`

MyCountryTitle	MySalespersonTitle	MyOrderDateTitle	MyExtendedPriceTitle
Argentina	Andrew Fuller	1/7/1998	\$477.00
Argentina	Andrew Fuller		\$477.00
Argentina	Anne Dodsworth	12/17/1997	\$12.50
Argentina	Anne Dodsworth	1/13/1998	\$932.00
Argentina	Anne Dodsworth		\$944.50
Argentina	Janet Leverling	1/9/1997	\$319.20
Argentina	Janet Leverling		\$319.20
Argentina	Laura Callahan	4/29/1997	\$225.50
Argentina	Laura Callahan	3/30/1998	\$2,220.00
Argentina	Laura Callahan	4/28/1998	\$305.00
Argentina	Laura Callahan		\$2,750.50
Argentina	Margaret Peacock	2/17/1997	\$443.40
Argentina	Margaret Peacock	10/24/1997	\$706.00
Argentina	Margaret Peacock	2/11/1998	\$150.00
Argentina	Margaret Peacock	2/20/1998	\$30.00
Argentina	Margaret Peacock		\$1,329.40
Argentina	Michael Suyama	4/13/1998	\$76.00
Argentina	Michael Suyama		\$76.00
Argentina	Nancy Davolio	2/27/1998	\$686.70
Argentina	Nancy Davolio		\$686.70
Argentina	Robert King	5/8/1997	\$110.00
Argentina	Robert King	3/10/1998	\$644.80
Argentina	Robert King	3/18/1998	\$781.00
Argentina	Robert King		\$1,535.80
Argentina			\$8,119.10
Austria	Andrew Fuller	11/29/1996	\$1,689.78

Figure 14: lightening of subtotal rows for two group level using conditional formatting