July, 2006

Advisor Answers

Create Cross-tabs

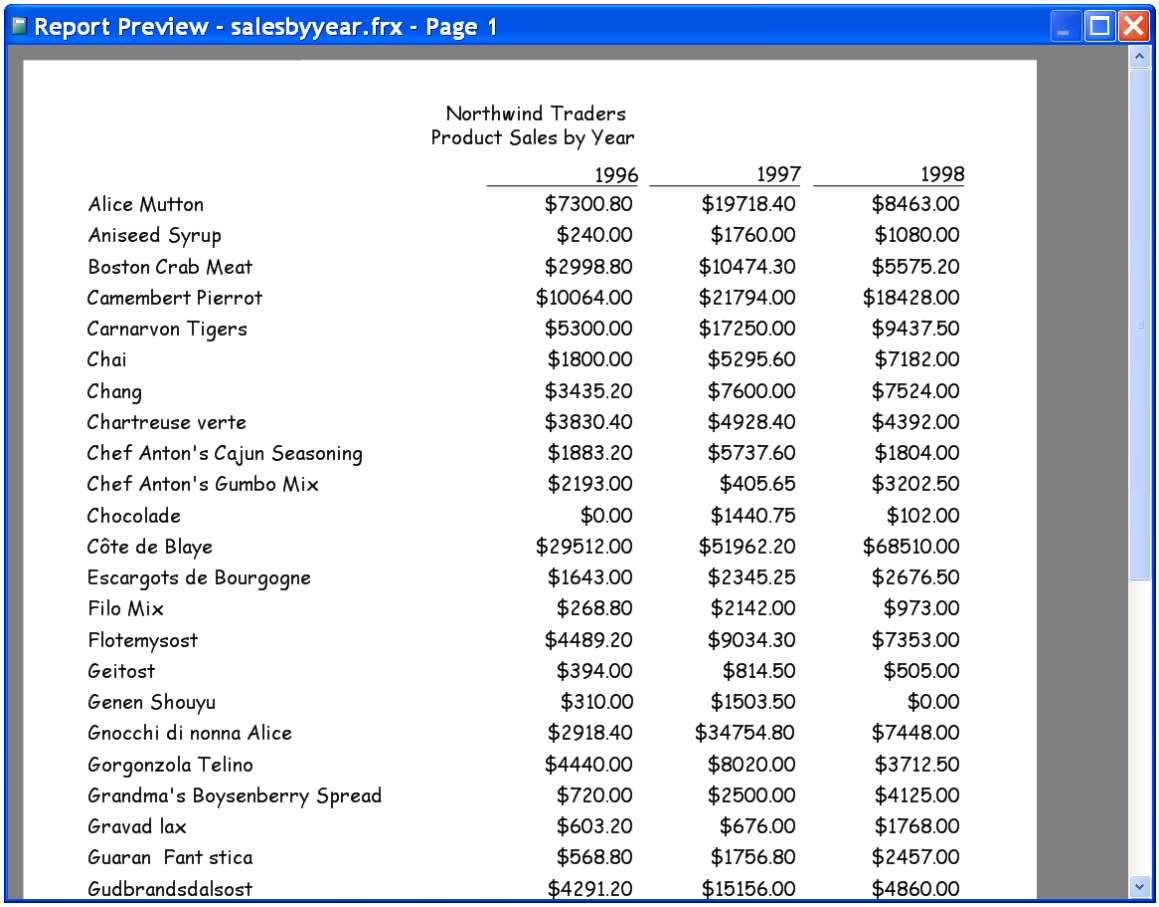
Visual FoxPro 9/8/7

Q: I have a database that stores sales data. The details table contains one record for each sale of each item. Now I want to create a report showing sales of each item for each of three years. I want a column for each year and a row for each product. How can I create such a report?

A: The kind of report you're looking for is called a cross-tab. Writing your own cross-tabulation can be pretty ugly. Fortunately, VFP provides a tool to do it for you.

The tool is VFPXTAB.PRG and it's in the VFP home directory. You hand it a cursor or table containing three columns and it creates a new table or cursor where, by default, the first column provides the row information, the second column provides the column information, and the third column supplies the data that goes where rows and columns intersect.

Let's look at an example to both clarify and show you how to use VFPXTAB. I'll use data from the Northwind database that comes with VFP. Figure 1 shows the report.



	1996	1997	1998
Alice Mutton	$7300.80	$19718.40	$8463.00
Aniseed Syrup	$240.00	$1760.00	$1080.00
Boston Crab Meat	$2998.80	$10474.30	$5575.20
Camembert Pierrot	$10064.00	$21794.00	$18428.00
Carnarvon Tigers	$5300.00	$17250.00	$9437.50
Chai	$1800.00	$5295.60	$7182.00
Chang	$3435.20	$7600.00	$7524.00
Chartreuse verte	$3830.40	$4928.40	$4392.00
Chef Anton's Cajun Seasoning	$1883.20	$5737.60	$1804.00
Chef Anton's Gumbo Mix	$2193.00	$405.65	$3202.50
Chocolade	$0.00	$1440.75	$102.00
Côte de Blaye	$29512.00	$51962.20	$68510.00
Escargots de Bourgogne	$1643.00	$2345.25	$2676.50
Filo Mix	$268.80	$2142.00	$973.00
Flotemysost	$4489.20	$9034.30	$7353.00
Geitost	$394.00	$814.50	$505.00
Genen Shouyu	$310.00	$1503.50	$0.00
Gnocchi di nonna Alice	$2918.40	$34754.80	$7448.00
Gorgonzola Telino	$4440.00	$8020.00	$3712.50
Grandma's Boysenberry Spread	$720.00	$2500.00	$4125.00
Gravad lax	$603.20	$676.00	$1768.00
Guaran Fant stica	$568.80	$1756.80	$2457.00
Gudbrandsdalsost	$4291.20	$15156.00	$4860.00

Figure 1: Creating cross-tabs—The VFPXTab tool lets you create cross-tabs, so you can consolidate data for periods of time, locations, or other groupings.

The first step in creating this report is to run a query that collects the data of interest. VFPXTab expects three columns; the example uses products for the rows, year for the columns and sales amount for the actual data. To call VFPXTab, you need a cursor with those three items.

Here's the query that does the initial data collection:

```
SELECT ProductID, YEAR(OrderDate) as nYear, ;
       Quantity*UnitPrice AS nSales ;
   FROM Orders ;
     JOIN OrderDetails ;
       ON Orders.OrderID = OrderDetails.OrderID ;
   WHERE YEAR(OrderDate) BETWEEN 1996 AND 1998 ;
   INTO CURSOR ProductsWithYears
```

Note that I don't have to group and sum in this query; the cross-tab program takes care of that.

The next step is easy: Call VFPXTab. The system variable _GENXTab points to the current cross-tab generator program. By using it, rather

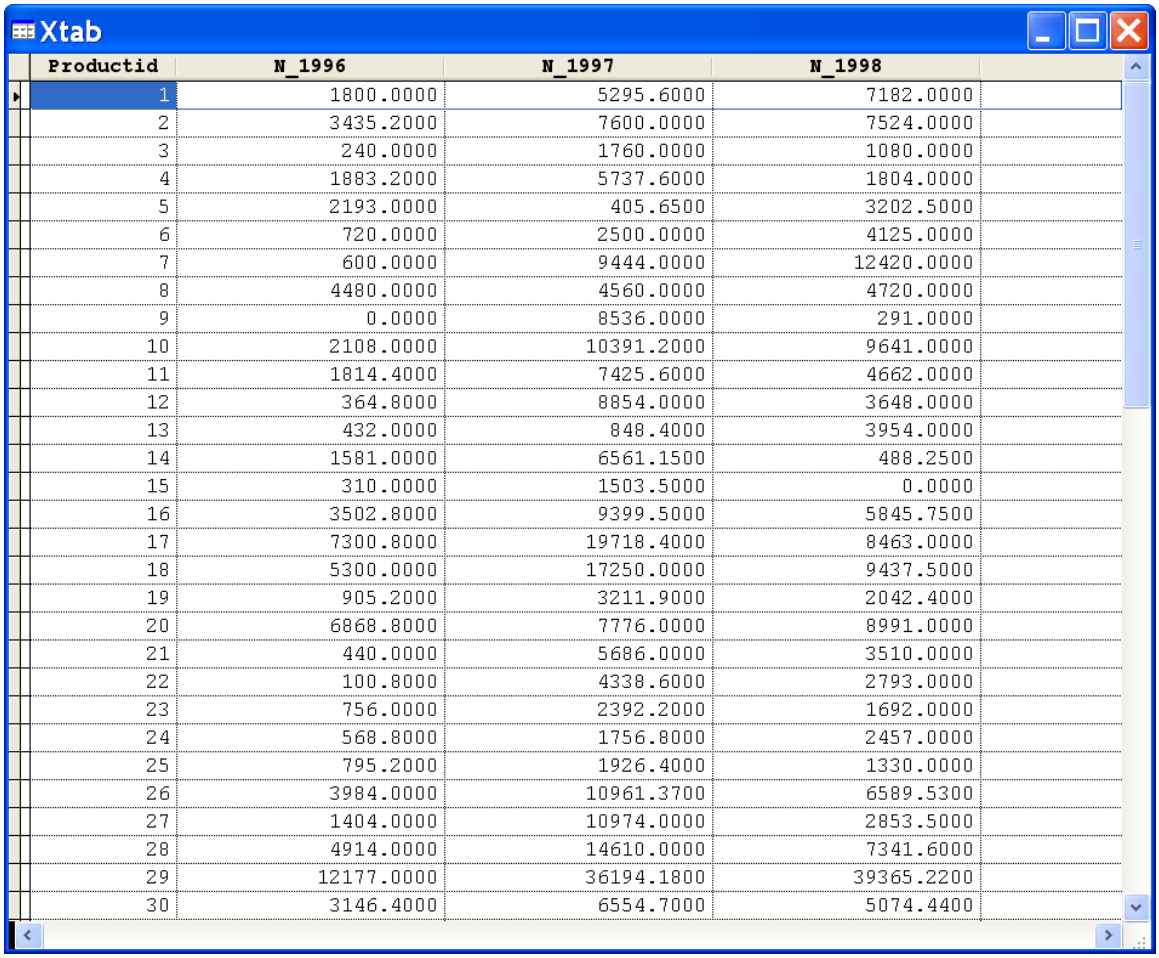
than pointing to a specific program, you make it easier to switch to another cross-tab generator. Regardless of which generator you're using, for runtime, you need to explicitly set _GENXTab to the right program and make sure to include that program in your project.

VFPXTab uses the table in the current work area as its input. It accepts up to 10 parameters, but all of them are optional. (They're documented in the header comments of the program.) In this case, you can ignore most of them.

When you don't specify otherwise, VFPXTab stores the results in a table named XTab.DBF. While the name XTab is fine, I'd prefer a cursor, so I'll pass the first two parameters, the name of the result, and a flag indicating whether to create a table (.F.) or a cursor (.T.):

```
DO (_GENXTAB) WITH "Xtab", .T.
```

Figure 2 shows the result. The first column contains the product ID; there's one row for each product. After that, there's one column for each year. VFPXTab reads the data in the second column of the cursor you supply and creates a column for each unique value. The name of the column is based on that value; in this case, because the values are numeric and VFP field names must begin with a letter or underscore, the field names are prefaced with "N_". The intersection of each row and column contains the total sales for that product in that year.



Productid	N_1996	N_1997	N_1998
1	1800.0000	5295.6000	7182.0000
2	3435.2000	7600.0000	7524.0000
3	240.0000	1760.0000	1080.0000
4	1883.2000	5737.6000	1804.0000
5	2193.0000	405.6500	3202.5000
6	720.0000	2500.0000	4125.0000
7	600.0000	9444.0000	12420.0000
8	4480.0000	4560.0000	4720.0000
9	0.0000	8536.0000	291.0000
10	2108.0000	10391.2000	9641.0000
11	1814.4000	7425.6000	4662.0000
12	364.8000	8854.0000	3648.0000
13	432.0000	848.4000	3954.0000
14	1581.0000	6561.1500	488.2500
15	310.0000	1503.5000	0.0000
16	3502.8000	9399.5000	5845.7500
17	7300.8000	19718.4000	8463.0000
18	5300.0000	17250.0000	9437.5000
19	905.2000	3211.9000	2042.4000
20	6868.8000	7776.0000	8991.0000
21	440.0000	5686.0000	3510.0000
22	100.8000	4338.6000	2793.0000
23	756.0000	2392.2000	1692.0000
24	568.8000	1756.8000	2457.0000
25	795.2000	1926.4000	1330.0000
26	3984.0000	10961.3700	6589.5300
27	1404.0000	10974.0000	2853.5000
28	4914.0000	14610.0000	7341.6000
29	12177.0000	36194.1800	39365.2200
30	3146.4000	6554.7000	5074.4400

Figure 2: Result—VFPXTab creates one column for each unique value in the second column of the original data.

A little polish

While VFPXTab has done the hard part, there's a little more to do before running the report. I want to show the name of the product, not its ID. In addition, while VFPXTab sorts on the first column, in this case, that's not the right order, since I want the report alphabetical by product name. Here's a query that combines the cross-tab results with the Products table to get the data in exactly the form needed for the report:

```
SELECT XTab.*, Products.ProductName ;
   FROM XTab ;
     JOIN Products ;
       ON XTab.ProductID = Products.ProductID ;
    ORDER BY ProductName ;
   INTO CURSOR SalesByYear
```

The only thing left to do is call the report. You'll find a program to build the data (SalesByYear.PRG) and the report in Figure 1 (SalesByYear.FRX) on this month's Professional Resource CD.

The other parameters you're likely to deal with are the fifth, sixth, and seventh. These let you specify which fields of your original cursor or table supply the rows (fifth param), columns (sixth param) and data (seventh param) for the cross-tab.

Although VFPXTab does a good job with what it can do, it is limited in some ways. In particular, it can only cross-tabulate one item at a time. If you want to cross-tabulate multiple fields (for example, quantity sold and total sales), you have to look at other tools. There are a couple of public domain cross-tab generators available for VFP, including FastXTab and MatXTab. You can find more information about them on the FoxPro Wiki at http://fox.wikis.com.

–Tamar