Chapter 12

Totally Special Desserts

Even though Rhonda was satisfied with the results of the report Rachel built in the previous chapter, she wanted to delve more deeply into the nature of her increased Christmas gifts. She wanted to be sure that her increase matched, in percentage terms, those of her siblings.

Although the report shown in Figure 11-X (page 49) provides all the information necessary to derive this knowledge, Rhonda was never very good at math. Since Rachel had had her fill of Rhonda's attitude, Rhonda asked their older brother Robert — who originally taught R&R to Rachel — to help her create a new report that provided year-by-year percentage increases for each sibling.

Much to Rhonda's delight, this report gave her the opportunity to learn something that Rachel did not know — even if it was just about silly old R&R.

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One of the cardinal rules of reporting is that R&R can only report on what is in the composite database. We can derive and show Rhonda's year-by-year gift value (*YrGftVal*) because we can group the records and create a total field to sum them. Figure 12-A illustrates this process as it relates to the composite database.

This technique worked fine for the report in the prior chapter because the field entries at the end-of-year group of records was printed in that group's footer band. To derive the percentage increase we need the formula:

$$\frac{\text{NEW } YrGftVal - \text{PREV } YrGftVal}{\text{PREV } YrGftVal}$$

We would find NEW *YrGftVal* and PREV *YrGftVal* in the composite database as shown in Figure 12-B. In order to derive the percentage change between consecutive years, we need to create a calculated field which we will call *YrChngPct*. Any calculated field's formula will only apply to field values in a *single* record, however, and the field values we need are in *separate* records. This will clearly cause a problem.[1]

What we need to do is derive the total for each year's gift value into the same composite record. Since grouping by year does not do so, we need another method.

Game, Set & Match

Remember back to junior high math class — way back for some of us — and the beginning of the fall term (at least for me it was). In my classes we always began with set theory, utilizing a diagram such as the one below. Set A and Set B share some of their elements (shown as Set C), while Set D is a subset of Set B — and so forth. It probably did not make much sense to you (nor to me!) then and it probably does not

Set A Set C Set B Set D
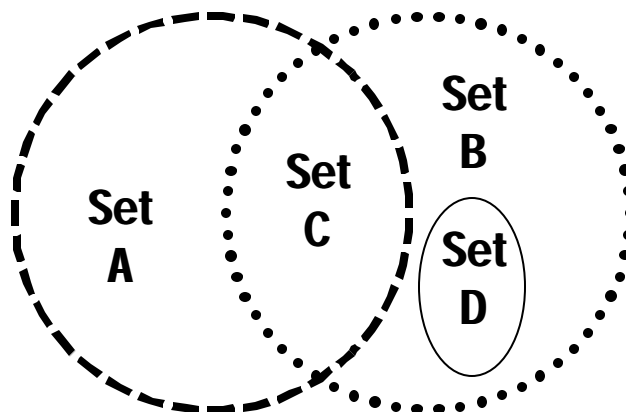
[1] The only exception to the calculated field rule described here applies to the PREVIOUS() function. PREVIOUS() will not work here because the records in question are not consecutive — a requirement for PREVIOUS(). PREVIOUS() is described in Appendix A of Volume One and in Chapter 17.

GIFTS.DBF

RECIP_CD	*XmasSeason*	VALUE	*YrGftVal*
RHON	1995	17.25	17.25
RHON	1995	11.00	28.25
		•	
		•	
		•	
RHON	1995	160.00	240.75
RHON	**1995**	**62.50**	**303.25**
RHON	1996	75.00	75.00
RHON	1996	14.50	89.50
		•	
		•	
		•	
RHON	1996	112.50	284.25
RHON	**1996**	**28.18**	**312.43**
		•	
		•	
		•	
RHON	1998	34.00	347.50

Rhonda's gift records for each year are grouped to derive a total for two consecutive years. Each total is independent of the other.

This is the last record in Rhonda's section of the composite database.

Figure 12-A: Rhonda's *YrGftVal* derived for two consecutive years in the composite database.

GIFTS.DBF

RECIP_CD	*XmasSeason*	VALUE	*YrGftVal*	96 Ttl	95 Ttl
RHON	1995	17.25	17.25		
RHON	1995	11.00	28.25		
		•			
		•			
		•			
RHON	1995	160.00	240.75		
RHON	**1995**	**62.50**	**303.25**		
RHON	1996	75.00	75.00		
RHON	1996	14.50	89.50		
		•			
		•			
		•			
RHON	1996	112.50	284.25		
RHON	**1996**	**28.18**	**312.43**		
		•			
		•			
		•			
RHON	**1998**	**34.00**	**347.50**	312.43	303.25

We need to move all of the years' gift totals down to the last record in Rhonda's section of the composite database to derive the percentage change.

Figure 12-B: Location in composite database of two values for *YrGftVal* needed to derive the percentage change between years.

now. But report writing — building the composite database — is an exercise in set theory.

If we apply some of this set stuff to Rhonda's report, each of her Christmas gifts received records falls in a set separate from her siblings. They each have their own set of records with no overlap with the others. This relationship is illustrated in Figure 12-C.

If we focus on only Rhonda's gifts, we can further place each gift record in a set representing the holiday season given. Figure 12-D presents these as subsets within Rhonda's larger Christmas gift set, along with those for her brother and sisters. In our last sample in Chapter 11, we set up a second grouping level by year. This let us stack each Rubin child's full record set and year record set for reporting. The individual year record sets do not overlap, however, and hence they cannot be compared via the report.

What we must do is separate the larger set's records into years while still only considering them within the larger set.
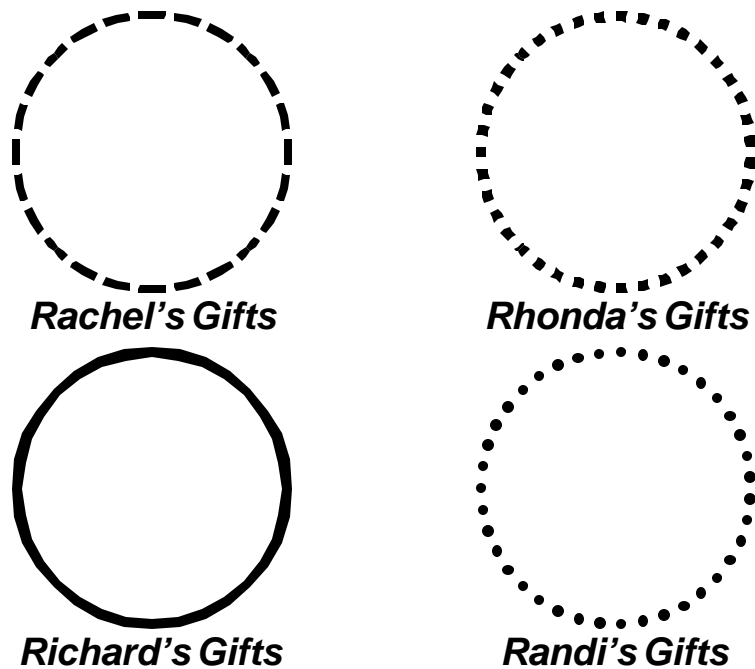

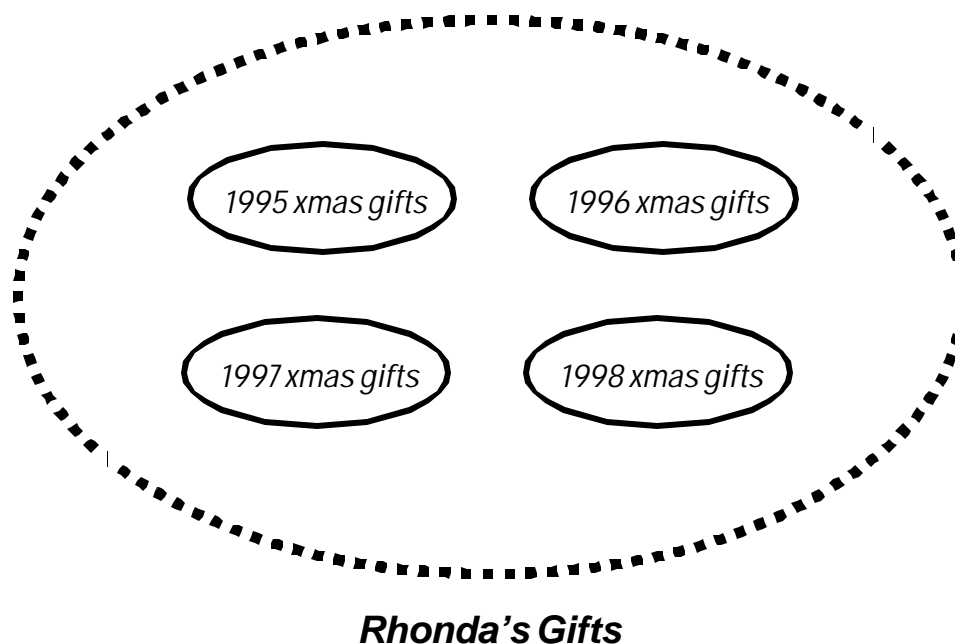**Figure 12-C: Christmas gift set diagram for Rubin siblings.**

Rhonda's Gifts

Figure 12-D: Year given subsets within larger set for each Rhonda's gifts.

I'll Do It Under One Condition

If we take away the year-by-year grouping and manually separated each record by year, the result would look like Figure 12-E. We would check the box representing the gift's year, then at the bottom we could count the check marks for each year to determine how many gifts were received in that year. We also could add the gift values for those checked to compute each year's total value.

This method of totaling selected records in a grouping (or totaling a subset) is called a **conditional total**. R&R gives us two methods to derive these kinds of totals, each with its own advantages. The first, and more direct, method is demonstrated in Figure 12-F. Upon clicking the "Options" action button, the Total Field dialog box extends to show several new total field controls. Although these controls are always in effect, R&R assigns default values for each of them. The defaults apply unless the user overrides them.

One of the new controls is the "Condition" action button. This button launches the Total Condition dialog box in the foreground. In the "Expression" box we will define a formula that will return a logical value — that is, yes or no.

GIFTS.DBF

The gift value total (or gift count or other statistics) is updated based on the *XmasSeason* value on the record.

RECIP_CD	*XmasS'*	VALUE	95 Ttl	96 Ttl	97 Ttl	98 Ttl
RHON	1995	17.25	17.25	0.00	0.00	0.00
RHON	1995	11.00	28.25	0.00	0.00	0.00
RHON	1996	14.50	28.25	14.50	0.00	0.00
RHON	1998	31.00	28.25	14.50	0.00	31.00
RHON	1996	21.25	28.25	35.75	0.00	31.00
RHON	1996	112.50	28.25	148.25	0.00	31.00
RHON	1995	62.50	90.75	148.25	0.00	31.00
RHON	1996	73.25	90.75	221.50	0.00	31.00
RHON	1998	34.00	90.75	221.50	0.00	65.00
RHON	1997	87.65	90.75	221.50	87.65	65.00
RHON	1995	62.50	153.25	221.50	87.65	65.00
RHON	1998	24.00	153.25	221.50	87.65	89.00
RHON	1995	32.50	185.75	221.50	87.65	89.00
RHON	1996	85.00	185.75	306.50	87.65	89.00
RHON	1998	34.00	185.75	306.50	87.65	123.00
RHON	1997	100.00	185.75	306.50	187.65	123.00

In composite database terms, we determine how each record in the non-year-grouped table gets summed (or counted) within Rhonda's group.

Figure 12-E: Composite database identifying the four years of Christmas gifts received.

We will use one of the more advanced R&R totalling features displayed by clicking the 'Options' button. This reveals the 'Condition' button which we click to display ...

... the Total Condition dialog box. This is nearly identical to the Calculated Field Dialog box, with the expression returning a logical result for each record. If true, the record's value for the basis field will be included in the total.
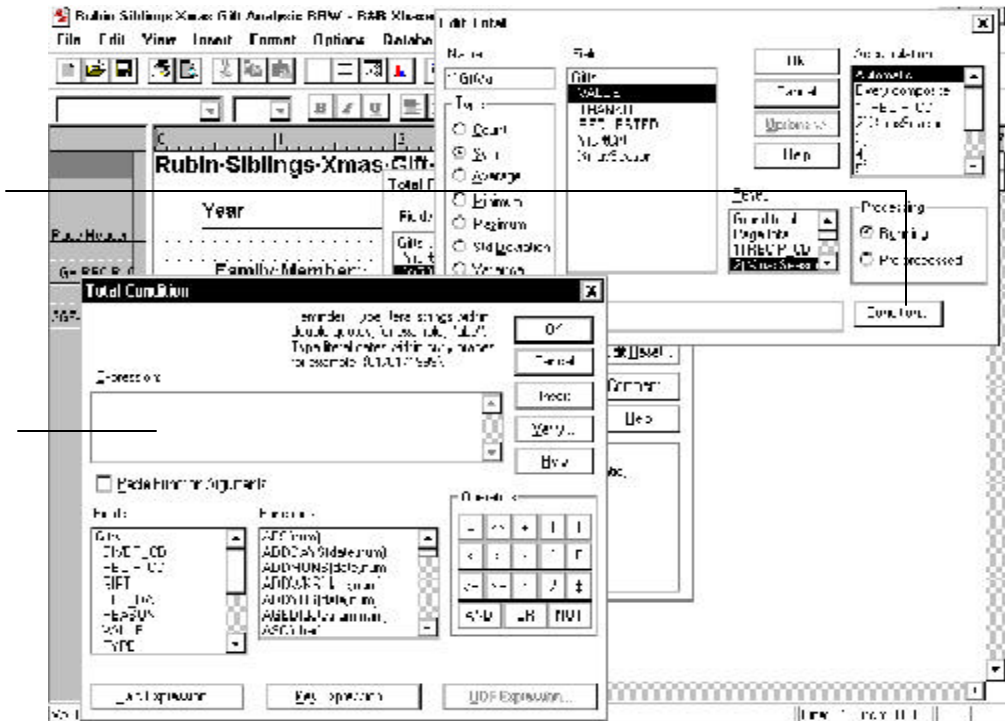

Figure 12-F: Condition box overlaying Total Field dialog box with extension for total "Options".

For holiday season 1995 this formula would be *XmasSeason* = 1995, as indicated at the top of the applicable column in Figure 12-E. After we close the Total Condition dialog box, this condition appears with the total. Figure 12-G displays the completed Total Field dialog box for *GftVal95*. Note that the field name reflects the condition statement.

Just as we summed field VALUE for *YrGftVal* from the prior sample report, we sum it for *GftVal95*. The other difference is the Reset basis, which is no longer based on grouping level two — *XmasSeason*. As you may have anticipated from the diagram in Figure 12-D, we must total on the basis of the larger set: field RECIP_CD.[2]

Figure 12-H (Page 60) exhibits the results of *GftVal95* as it applies to the composite database. There are two key elements to observe here. First, R&R ignores records that are not from *XmasSeason* 1995 for totaling. Second, each time R&R finds the next RECIP_CD value it will restart totaling *GftVal95*. This process places the year's total for each Rubin sibling in the last record of the group.

Note: Conditional totals were not available prior to R&R version 6 for both MS-DOS and Windows. Thanks guys!!

The commands for conditional totals in MS-DOS versions is: **/ F**ield **T**otal **O**ptions **C**ondition. R&R prompts us to select a total field, so it must have been defined without any conditions prior to this series of commands.

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[2] Normally I would have named the total field beginning with the condition, but R&R does not allow a digit as the first character of a derived field name. (Neither does xBase and other database systems.) Hence, *95GftVal* would be invalid.
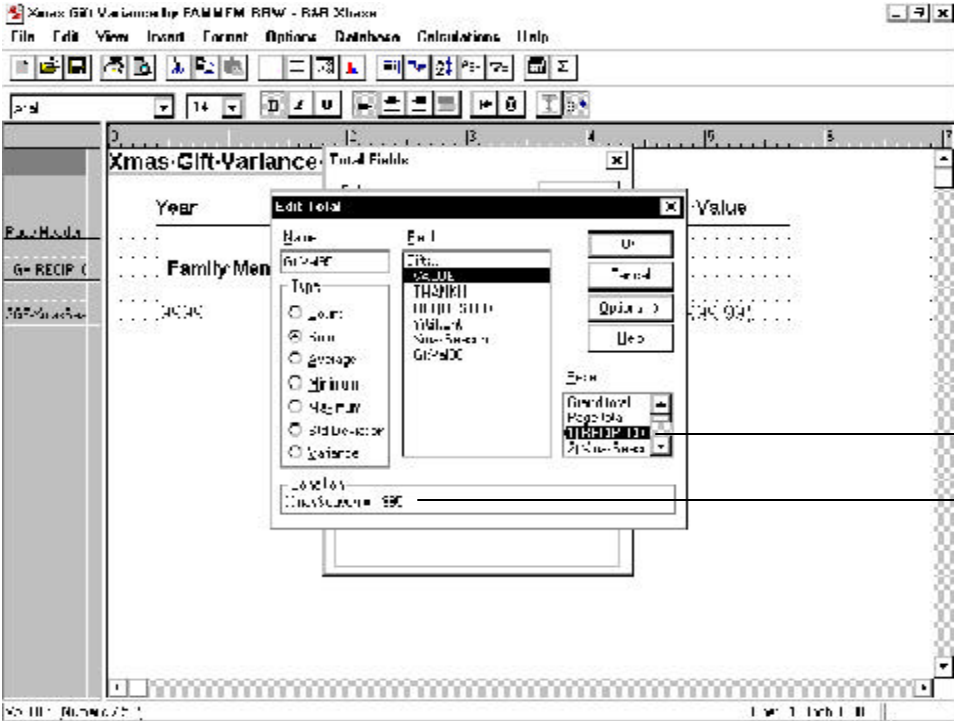
Note that *GftVal95's* reset level has been adjusted to RECIP_CD, the first grouping level, instead of the XmasSeason. This is because the condition statement generate a subset total for the *XmasSeason* 1995.

Figure 12-G: Total Field dialog box for *GftVal95*.