Arrays Part II

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This article continues our discussion of arrays. It may help to review the last article in *RCM Advisor* to refresh your memory on arrays before tackling this article. Arrays can add a terrific amount of power and flexibility to Excel formulas, but they take practice to get used to the syntax. The last article had examples of two formulas at the same time. This article begins with more examples of two formulas at the same time. The most important thing to remember as you follow the examples in this article is to finish the formulas with Ctrl+Shift+Enter to get the curly braces that surround Excel formulas.

Two Formulas at Once

We will start with a simpler example to pick up where the last article left off. Assume you have a chart like Figure 1 in a dashboard or other report. Column A has dates, and column B has a tally mark, X in our case. One way to count the number of tally marks is to use the LEN function, shown in column C. After using the LEN function, the SUM formula in cell C30 gives the total number of tally marks by summing the results of the LEN function in column C. A simpler approach that takes less space and formulas on your spreadsheet is the formula in cell B30, {=SUM(LEN($B$21:$B$29))}.

Array formulas are easier to understand by working from the inside of the formula out. This array formula calculates the length of each cell from B21 to B29 and then sums the results. Remember to not enter the curly braces. Instead, use Ctrl+Shift+Enter when entering the formula and Excel will enter the braces automatically. You must use Ctrl+Shift+Enter. If you try typing the braces as part of your formula, the array formula will not work.

As quality and other performance measures become increasing complicated, the ability to perform multiple functions simultaneously becomes very helpful. Figure 2 has another example. Five quality measures are shown in H21:H25. The measures are summed in H26, and the result is rounded in cell I26. In column J, the measures are rounded first and then summed in cell J26. Note that summing and then rounding results in an answer of 26, while rounding and then summing results in an answer of 28. The formula in

FIGURE 1

cell J28 combines the rounding and summing with this formula: {=SUM(ROUND($H$21:$H$25,0))}.

Be careful with array formulas. When I copied the formula to include it in this article, Excel removed the braces. The array formula is still in the cell, but the braces are missing. To fix the problem, simply edit the formula (either click inside the formula or use F2) and then finish the formula with Ctrl+Shift+Enter again to restore the curly braces and the array formula.

Three Formulas at Once

Figure 3 shows a more complex array formula as another example of what can be done with array formulas. The objective of the formula is to determine if the list of physicians in column A is unique. The formula in cell C1 is {=IF(MAX(COUNTIF($A$1:$A$19,$A$1:$A$19))>1,"List is NOT Unique","List IS Unique")}.

Working from the inside out, the first function is COUNTIF, which counts the number of occurrences of criteria in a range of cells. Normally COUNTIF has a single, set criteria to look for. In this array, COUNTIF can count each cell from A1:A19

FIGURE 2

FIGURE 3

in the range from A1:A19 at the same time. The MAX function takes the highest result of the COUNTIF function. Finally, the IF function evaluates the result of the MAX function. Recall that the syntax of an IF function is (logical test, value if true, value if false). The logical test is the result of the MAX function. If the maximum number of results from the COUNTIF function is greater than one, we know Excel counted more than one result for at least one of values, and there are duplicate providers in the list. Since the logical test is true (Dr Kim is in cells A6 and A7), the value if true section of the IF statement fires, which results in "List is NOT Unique."

If the list was unique, the maximum COUNTIF value would be 1 and the value if false section would fire, resulting in "List IS Unique."

Clearly, array functions can get very complicated very quickly. Build test columns and take the array formulas a piece at a time to make sure you get the results you expect. Once you do have an array formula working, the potential to quickly make a lot of calculations in a small amount of space is quite powerful. There are more array examples in the Excel video playlists at mooresolutionsinc.com. ∎

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