Wordman's Production Corner

By Dick Eassom

Do The Math!

A further look into the power of using Microsoft® Word's field codes for automatic page numbering in foldouts

The Problem

I had an e-mail from Karen Rush, a desktop publishing specialist at Battelle in Columbus, Ohio, concerning automatic page numbering on foldout pages.

Her situation involved adding automatic page numbering to a foldout. To quote Karen, "Sometimes our foldout is five or more pages and we need each page to be counted as two pages. In following the directions, I was able to create the Page 1/2 but the second page reads Page 2/3. Is there a solution so that it will read Page 3/4, Page 5/6, etc? Our foldout pages are usually a single large table, so putting in continuous section breaks won't work without splitting the table, which we prefer not to do. These pages are sometimes intermixed with letter size pages. For example: letter pages for first four pages; fold-out table with five pages (each counting as two); letter pages for final six pages, for a total page count of 20."

Regular readers of this column will remember that I explained how to insert foldouts—i.e., 11- by 17-inch (or A3) pages in an 8½- by 11-inch (or A4) document—in my "Foldouts 101" article in the Fall 2005 issue of the APMP *Perspective*. I also covered using field codes for automatic page numbering in "A Field Trip" in the Fall 2003 issue of the *Perspective*. The latter article was merely an introduction into the use of field codes, and covered only one specific purpose. There is obviously a lot more you can do with the multitude of available field codes, and specifically more you can do with the page number fields.

So how can we use field codes to solve Karen's problem?

The Solution

Back to school...

Remember those math lessons at school? Yes, I'm sure you do—with either joy or depression, depending on your affinity to math! Personally, I loved math lessons, and was able to fall back on one of the fundamentals of algebra to solve this problem: the 2-dimensional linear equation. You all probably remember this better as $y = mx + b$ (or $y = mx + c$ for our British readers), where x and y are variables, and m and b (or c) are unknown constants. Since this is a linear equation, it describes a straight line;

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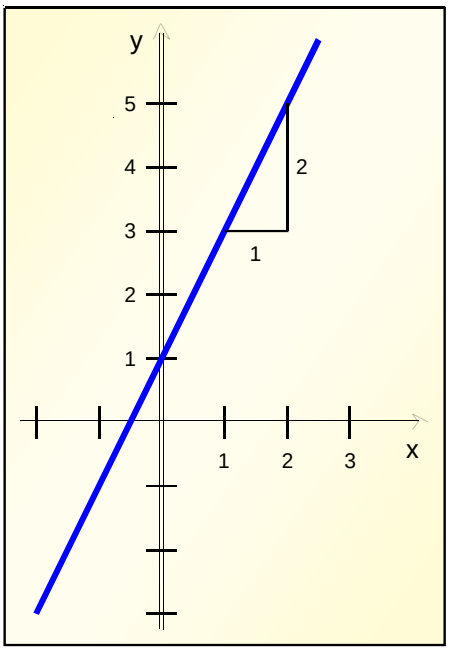
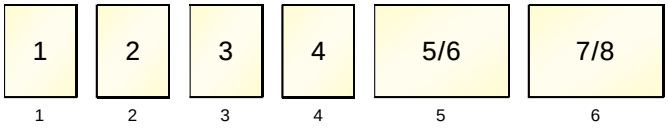
thus, m is the slope of the line and b (or c) is the intercept on the y axis. I hope that this all rings a bell, but a picture might do the trick:



In this example, the slope of the line, m, is given by 2/1, i.e., 2, and the intercept, b, is 1. Hence, y = 2x + 1. Pretty simple stuff, and if you haven't used this in a while, I'll bet memories of those math lessons are flooding back! We can use the same technique for creating a formula to calculate foldout page numbers, such as in Karen's scenario.

Back to foldouts...

Let's assume that our first foldout page is page 5, and would therefore be marked as Page 5/6. The next foldout page would be Page 7/8, i.e., what Word considers page 6 has to be marked as if it were page 7. We'll ignore the second of the two page numbers on each foldout page for now.



Using the linear equation, where x is Word's page number and y is the number we want printed, the desired page number for the first foldout page is given by:

$5 = 5m + b$ (i.e., page 5 is marked as page 5)

and the second by:

$7 = 6m + b$ (i.e., page 6 is marked as page 7)

You've probably remembered by now how to solve these things! From the first equation, we can derive that $b = 5 - 5m$. Substituting that into the second equation, we get:

$7 = 6m + 5 - 5m$

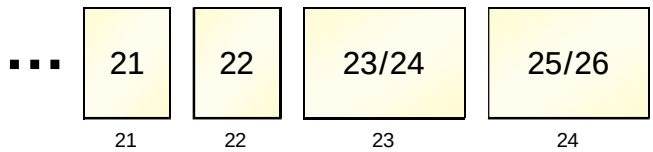
Rearranging this gives us a value for m of 2. This makes sense, since we have two counted pages for each foldout page. We can now substitute $m = 2$ into the first equation, giving $b = -5$. Therefore,

$y = 2x - 5$

To check this, we can try different values of x, the Word page number, and see that we get the correct values of y, our desired page number:

x	y
5	5
6	7
7	9

And so on. Well that seems to work, but what if the first foldout page is, say, 23?



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Now our equations are:

$23 = 23m + b$ and $25 = 24m + b$

Solving these equations still gives us $m = 2$, of course, but now the value for b is -23. Try this for a few more scenarios and you'll see that there's a pattern. The slope, m, is always 2, and the intercept, b, is always the inverse of the real page number of the first foldout page. If we use the variable s to represent the real page number of the first foldout page, we can write a general equation for the desired page number as:

$y = 2x - s$

As we need to display two page numbers on each foldout, the equation for the second page number is simply:

$y = 2x - s + 1$

Using Word's fields to display the page numbers

Please refer to "A Field Trip" in the Fall 2003 issue of the APMP ***Perspective*** for how to insert field codes into the page footer. Using the same notation as that article, our footer field codes will be:

a. Pages up to foldout pages:

   `Page { PAGE }`

b. Foldout pages:

   `Page { = 2 * { PAGE } – s }/{ = 2 * { PAGE } – s + 1 }`

   where s is the real page number of the first foldout page

c. Pages after foldout:

   `Page { = { PAGE } + n }`

   where n is the number of foldout pages up to that section in the document

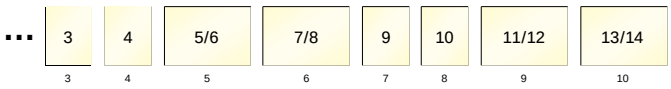
Note that if you want the "Page 45 of 60" style of page numbering, simply add

of `{ = { NUMPAGES } + N }`

into each footer, where N is the total number of foldout pages in the document. Of course, you may not know the value of N until you've finished the document, but it's a simple exercise to go through the footers in each section and changing the value.

What if there are more foldout sections?

Let's say that we have a second block of foldouts starting at page 11:



We already know the equation for page numbers on the first block of foldouts, so let's look at the second block. These are:

$11 = 9m + b$ and $13 = 10m + b$

As we know that $m = 2$, this gives $b = 7$. If you repeat this with the second block of foldouts starting at different page numbers, you will see a pattern emerge, i.e., the value of b is the real page number of the first foldout in the second block, less the number of foldout pages in the first block. In this case, $s = 9$ and there are two foldout pages in the first block, hence $b = (s - 2) = 7$.

You can also repeat the exercise for a third block of foldouts, etc. You will see that the pattern continues such that we can use n again as the total number of preceding foldout pages. We can write this as:

$y = 2x - (s - n)$

You may have noticed that this equation also works for the first block of foldouts since $n = 0$, giving us $y = 2x - s$, our original equation. As George Peppard, as Col. John "Hannibal" Smith in the old "A-Team" TV series, used to say, "I love it when a plan comes together."

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We now only have two document footer types to consider:

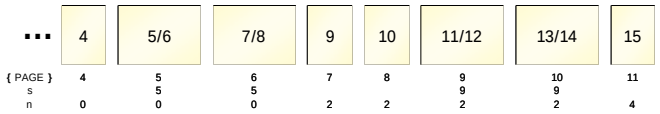
a. Non-foldout pages:

Page { = { PAGE } + n }

b. Foldout pages:

Page { = 2 * { PAGE } – (s – n) }/{ = 2 * { PAGE } – (s – n) + 1 }

All we need to do is to substitute the appropriate values of n, the total number of preceding foldout pages, and s, the real page number of the first foldout page of the section, in each section's footer, as shown below:



Summary

In my second expedition into automatic page numbering for foldouts, you now have a general case for practically any combination of regular pages and foldouts. If you have any scenarios that don't work using this method, please send me an e-mail at the address below. In a future article, I'll show you some more uses of Word's multitude of field codes.

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