

## Problem of the Week 5, Spring 2006

**Solution by Richard Abdelkerim (edited).** First of all, the sum of digits of  $N$  must be equal to 10 because there are only 10 "slots" in which to place a digit. Also, the first digit cannot be zero because that would mean there are zero zeroes, but by placing a zero in the first slot that means there is at least one zero! So, suppose the first digit is nine and fill the rest with zeros:

9000000000

This doesn't work because it doesn't account for the one 9. So, we have:

9000000001

But now there's one 1 and only eight 0's, so:

8100000010

Oops! Now there are two 1's and only seven 0's, so:

7210000100

But now there are only six 0's, so the final change is:

6210001000

Now there are six 0's, two 1's, one 2, and one 6. Furthermore, the sum of digits is 10, just as predicted. Hence,  $N = 6210001000$ .