PROBLEM OF THE WEEK

9/23/14 **due** **NOON** 10/6/14

CAN YOU GIVE US A SOLUTION?

Problem No. 5 (Fall 2014 Series)

Start with a five–tuple of numbers (a, b, c, d, e) and call numbers which are next to each other neighbors. Also the first and last entries are neighbors. Make a new five–tuple by replacing each entry by the average of its neighbors:
$$\left(\frac{(e+b)}{2}, \frac{(a+c)}{2}, \frac{(b+d)}{2}, \frac{(c+e)}{2}, \frac{(d+a)}{2} \right).$$
Next make a third five–tuple from the second in the same manner, and iterate this process indefinitely. Prove that as the number of iterations approaches infinity the five–tuples approach (q, q, q, q, q) for some number q.