1. You are monitoring an aggregation of several Twitter feeds, which is composed of a sequence
   of $k$-character messages (“tweets”). You are trying to count the number of tweets that are
   repeated over the course of some given, large number $N$ of tweets ($N$ is greater than the
   number of distinct characters that may appear in a tweet; assume these characters are thus
   represented as numbers in the range 0–$N$). Give a randomized algorithm that with probability
   $1 - \delta$ returns a count of the number of tweets that are repeats of previous tweets among the
   first $N$ tweets. Your algorithm should only use $O(k)$ arithmetic operations per tweet and
   only use $O(\frac{1}{\delta}N^2 + k)$ memory. You may assume that you are given a subroutine that given
   any $b$ (for any $b = O(\log N + \log \frac{1}{\delta}))$, returns a $b$-bit prime number in $O(1)$ time, that you can
   choose random $b$-bit integers in $O(1)$ time, and that any amount of memory can be allocated
   initialized to 0 in $O(1)$ time. As usual, you must prove that your algorithm meets the stated
   guarantees.

2. Kleinberg & Tardos Chapter 13, question 4

3. Kleinberg & Tardos Chapter 8, question 32