Please write a console application in C++ that would read a stream of ascii numbers from standard input, and incrementally, at each step, print the following:

1. tenth smallest number encountered so far
2. median of all the numbers encountered so far.

Please focus especially on the following three things:
1. (very crucial) scalability. How long will it take to process 10,000,000 numbers?
2. clarity of the algorithm
3. good use of data structures -- i.e. If we were to reformulate some part of the task, the unaffected parts would not need to be rewritten.

In addition, please provide a supporting essay, discussing the algorithm, especially design issues you consider important, its complexity (please think through how it scales with the size of the problem/stream) and your code's limitations.

Discuss also what design decisions were made to optimize performance of the algorithm, and under what circumstances further performance optimization might be possible, e.g. if the problem was modified a little. For example, how would you modify the design if we asked for the median after every few numbers instead of after every number? What if we asked for an approximation to the median rather than the exact median?

We don't want to place any other restrictions on how exactly you will solve this problem, but we'd appreciate if you didn't use third-party libraries.