1. $N \cdot 1/2^{N-1}$, 绿宝书原题，扩展：如果不是半圆而是长度 p 的圆弧（假设圆周长为 1），那么 $N \cdot p^{N-1}$
2. 10, 用 markcov chain 的 absorbing states 的方程组可以解出来，绿宝书上有类似题目
3. 2.62， 绿宝书原题
4. $2\times\min(p, 1-p)$, see www.mathproblems.info/prob11-tucker.pdf
5. $40/3$，灯泡互相 independent，并且 memory-less，计算寿命最小值的 expectation，用 order statistics
6. correct
7. $1 - n/2^{n-1}$等价条件是对任何一条边，其长度必须大于其他边的和
8. I think average is better for a 20 mins window, median would be better for a longer time window
9. (n+1)/3
10. x & (x-1) == 0
11. smart pointer, will update code soon
12. leetcode, reverse a linked list, will update code soon
13. find the smallest M x_i, will update code soon
14. KMP, will update code soon
15. exp(x), after using Taylor expansion, we can use divide and conquer to calculate the power of x
16. stream median algorithm: see here www.cs.dartmouth.edu/~ac/Teach/CS49-Fall11/Notes/lecnotes.pdf Chapter 9 streaming algorithm for finding any order statistics (including median), called Munro-Paterson Algorithm.
    a. Keep a filters a,b such that a <= median <= b
    b. As we read stream, calculate a and b's ranking and shrink a and b towards the middle
17. Leetcode, will update code soon