

2/5, -0pt for 1st time lateness--try to be more careful next time

COS 488 Problem Set #1 Problem #1

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$$\begin{aligned}A_N &= 1 + \frac{2}{N} \sum_{1 \leq j \leq N} A_{j-1} \\NA_N &= N + 2 \sum_{1 \leq j \leq N} A_{j-1} \\NA_N &= N + 2A_{N-1} + (N-1)A_{N-1} - (N-1) \\&= (N+1)A_{N-1} + 1 \\\frac{A_N}{N+1} &= \frac{A_{N-1}}{N} + \frac{1}{N(N+1)}\end{aligned}$$

Expanding this recurrence, we obtain $\frac{A_N}{N+1} = A_0 + \sum_{j=1}^N \frac{1}{j(j+1)}$. Note that $\frac{1}{j(j+1)} = \frac{1}{j} - \frac{1}{j+1}$, so the sum telescopes to $1 - \frac{1}{N+1} = \frac{N}{N+1}$. As a result, $A_N = (N+1)A_0 + N$. **-0.5pt, problem says $A_0 = 0$ so should be $A_N = N$**

-2.5pt, you forgot the part about quicksort :(