Exercise for Analysis of Algorithms

Exercise T26

Find the exponential generating function for

$$a_n = a_{n-1} + (n-1)a_{n-2} + (n=0).$$

Exercise T27

An algorithm is given an array of length $n \geq 0$ and, if $n \geq 2$, for each $1 \leq k \leq n$ calls itself on some random subarray of length k with probability $\frac{1}{2}$. Compute the exponential growth of the running time of this algorithm.

Exercise H18

Calculate $[z^n]G(z)$ up to an additive error of $O(4^n)$ for

$$G(z) = \frac{15z^2 + 8z + 1}{15z^2 - 8z + 1}.$$

Exercise H19

$$A(z) = \frac{\sqrt{1-z^7}}{2z^2 - 3z + 1} \qquad B(z) = \frac{1-z^2}{e^{z+3z^2}} \qquad C(z) = z^5 + 3z^2(z^3 + z^2 + 8)$$

Sort the coeffcients a_n, b_n und c_n by their asymptotic growth in ascending order.