

Exercise for Analysis of Algorithms

Exercise 14

Given an array a of length n , an algorithm compares all pairs $(a[i], a[j])$ for all $i < j \leq n$, and then calls itself recursively on all proper prefixes of a .

How often does the algorithm compare two pairs? Use the repertoire method!

Exercise 15

Use the repertoire method to find a closed form for the following recurrence:

$$\begin{aligned}a_0 &= 5 \\a_1 &= 9 \\a_n &= na_{n-1} + n^2a_{n-2} - n^4 - 3n^2 + 5 \quad \text{for } n \geq 2\end{aligned}$$

Exercise 16

Use summation factors to solve the following recurrence:

$$\begin{aligned}a_0 &= 0 \\a_n &= \frac{a_{n-1}}{n} + \frac{1}{(n-1)!} \quad \text{for } n \geq 1\end{aligned}$$