

When the order of elements cannot be guessed beforehand

Homework - 7

2/ b) Best case \rightarrow The array would be equally divided into 3 sub arrays always.

$$T(n) = 3T(n/3) + \Theta(n)$$

$$a=3$$

$$b=3$$

$$\log_b a = 1 = k$$

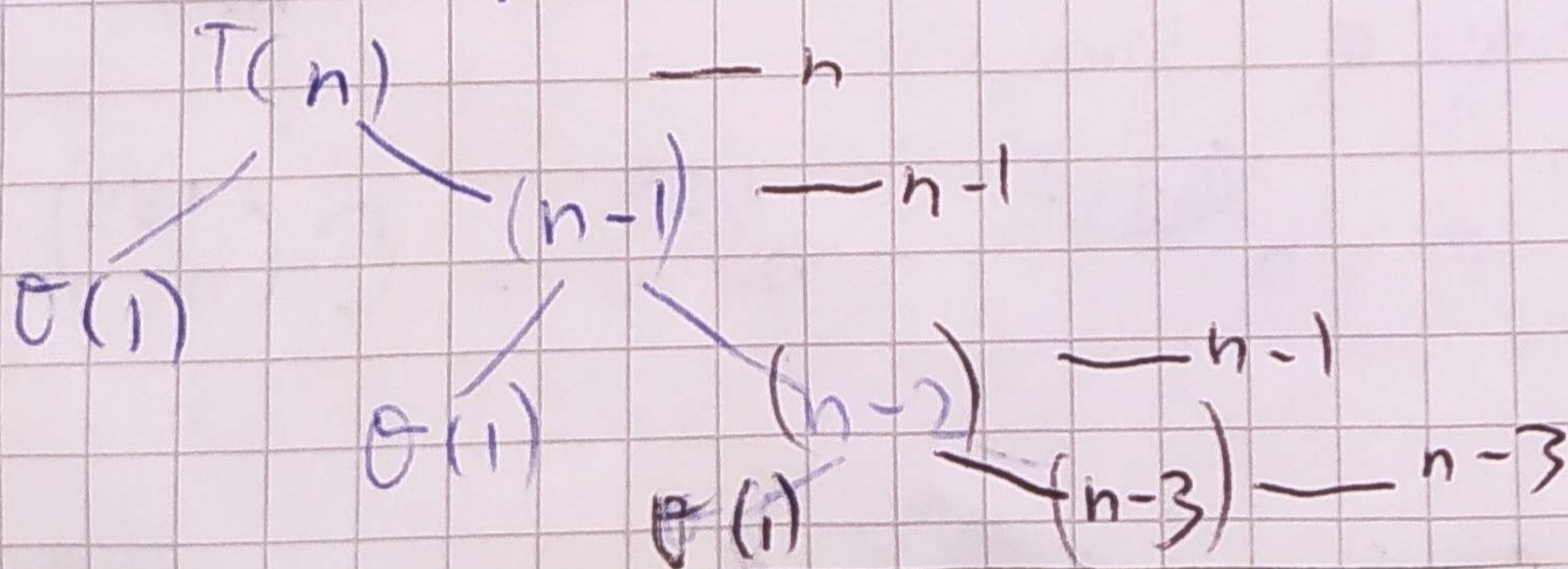
$$f(n) = \Theta(n^k \log^p n)$$

Case 2: $p > -1$

$$\Theta(n^k \log^{p+1} n) = \Theta(n \log^2 n)$$

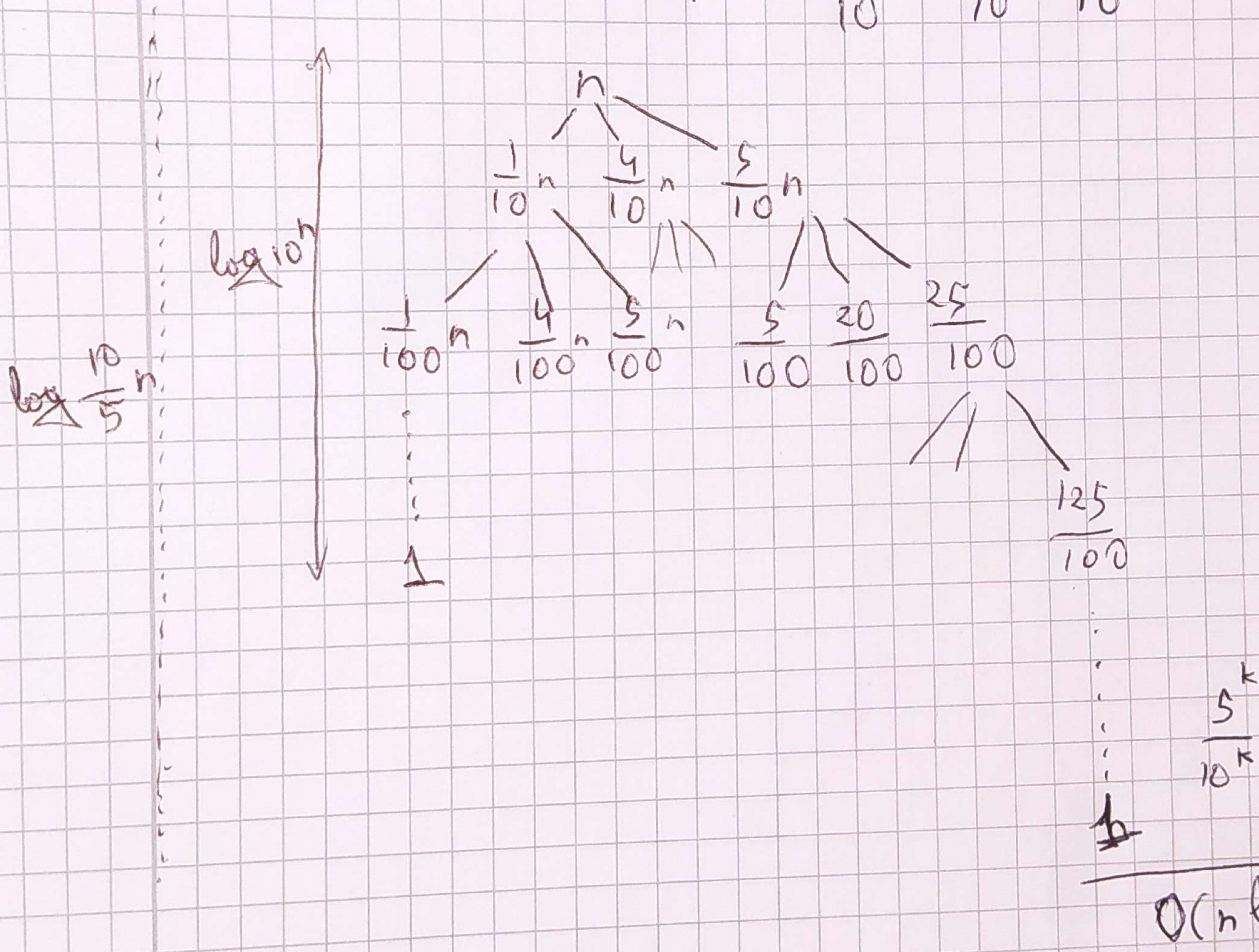
Worst case \rightarrow All the elements would be grouped only in one of the three subarrays.

$$T(n) = T(0) + T(0) + T(n-1) + \Theta(n)$$



$$\sum_{k=0}^n n = \frac{n(n+1)}{2} = \Theta(n^2)$$

Average case \rightarrow Take as example if the subarrays are split $\frac{1}{10} : \frac{4}{10} : \frac{5}{10}$



The base of the log. is dependent on the way the array is distributed.