FTP_Alg_Week 4: Exercises

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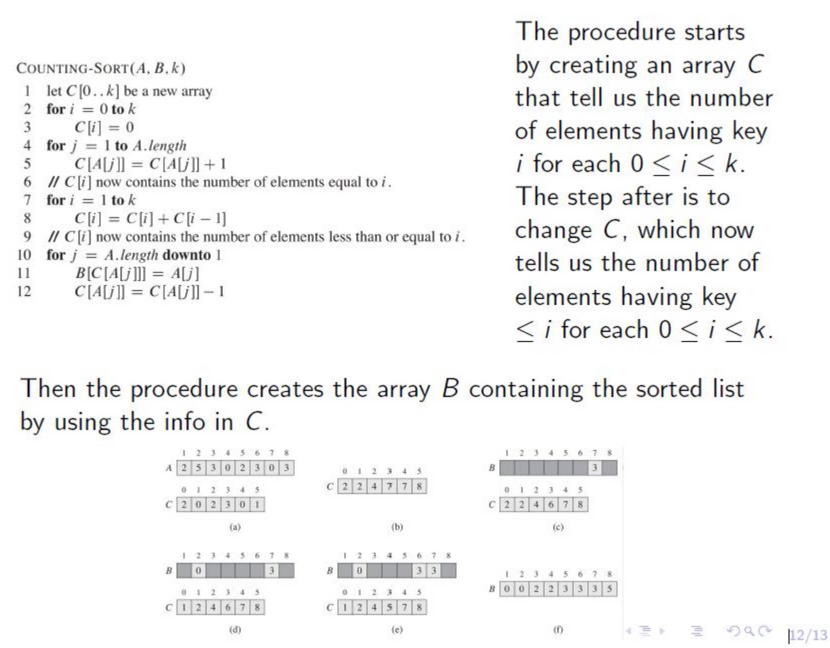
07 October 2024

Exercise 1 (Here it is enough to give an intuitive idea of the solution) *Prove that the worst case in Partitioning Algorithm (for Quicksort) has running time* $\Theta(n^2)$*, where* n *is the cardinality of the set of element of the partitioning.*

Exercise 2 *We apply COUNTING–SORT (Lecture 7) with the input the vector*

$$A = (5, 6, 5, 3, 3, 7, 4, 4, 4, 5, 3, 8, 8)$$

Let C *and* B *be the arrays mentioned in the pseudocode of COUNTING–SORT (below is the original algorithm from our lecture slides).*



1. *Let* C *be the array obtained after the for loop at line 7 and 8 of the pseudocode (so the array at the step (b) of the figure at slide 12 of Lecture 7). The entry* $C[7]$ *is the number ...*

2. *We consider the first cycle* ***for*** *at line 10 of the pseudocode (see (c) of the figure at slide 12 of Lecture 7) in the figure. The number* $B[13]$ *is ...*

3. *We consider the first cycle* ***for*** *at line 10 of the pseudocode (see (c) of the figure at slide 12 of Lecture 7). At the end of the first cycle, the number* $C[8]$ *is ...*

Exercise 3 (*) *Let* n *be a non negative integer and* $P = \{p_1, p_2, \ldots, p_n\}$ n *real numbers. Prove that there is a complete binary search tree having the points in* P *as leaves.*