

Advanced algorithms - Assignment 1

(Phd students have to do all the questions, irrespective of there is a choice or not)

1. [3 marks] Consider the recurrence equations given below

$$T(n) = aT\left(\frac{n}{b}\right) + cn^k$$

$$T(1) = c$$

Solve at least one of the following:

- a. $T(n) = O(n^k)$ if $a < b^k$
 - b. $T(n) = O(n^k \log n)$ if $a = b^k$
 - c. $T(n) = O(n^{\log_b a})$ if $a > b^k$
3. [3 marks] Divide and conquer: Answer one of the following
- a. Question 2 in Chapter 3 of Kleinberg and Tardos
 - b. Question 3 in Chapter 3 of Kleinberg and Tardos
4. [4 marks] Greedy algorithm: Answer one of the following
- a. Question 6 in Chapter 4 of Kleinberg and Tardos
 - b. Question 10 in Chapter 4 of Kleinberg and Tardos