

2nd Exercise sheet for Advanced Algorithmics, SS 15

Hand In: Until Monday, 04.05.2015, 12:00 am, in lecture, exercise sessions, hand-in box in stairwell 48-6 or via email.

Problem 2

4 points

Give a standard-parameterised many-to-one reduction from VERTEX COVER to DOMINATING SET. You may pick suitable parameters.

Problem 3

4 points

Give an algorithm that computes a minimal vertex cover for a given tree in time $\mathcal{O}(n)$, n the number of tree nodes.

Problem 4

2 points

Consider a MAX-SAT instance (φ, k) with $k \leq \lceil \frac{m}{2} \rceil$ and any variable assignment α of φ .

We define $\bar{\alpha}$ by

$$\bar{\alpha}(x) = \neg\alpha(x) \text{ for all variables } x .$$

Show that $\bar{\alpha}$ satisfies φ if α does not, i. e.

$$\alpha(\varphi) < k \implies \bar{\alpha}(\varphi) \geq k .$$

We continue assignment function α on formulae so that it returns the number of satisfied clauses given α .