

## 6th Exercise sheet for Advanced Algorithmics, SS 13

**Hand In:** Until Wednesday, 29.05.2013, 12:00am, Exercise sessions, hand-in box in stairwell 48-6 or email.

### Problem 10

- a) Consider the algorithm for solving MAX-SAT as presented in lecture and determine the respective runtime for
- reduction to the kernel,
  - expanding a single node and
  - the complete algorithm without interleaving.

Assume that reduction uses the procedure given in lectures as well as rules ii) (incl. its equivalent for FALSE) and iii) from Problem 5.

Assume furthermore the following branching strategy:

“Choose a most frequently occurring variable  $X$  and branch with  $X = \text{TRUE}$  and  $X = \text{FALSE}$ .”

- b) Consider the algorithm from a) with MAX-SAT instance  $(\varphi, k)$ , where  $k = 7$  and

$$\varphi = (a \vee b \vee c) \wedge (a \vee b \vee \neg c) \wedge (a \vee \neg b \vee c) \wedge (\neg a \vee b \vee c) \\ \wedge (\neg a \vee \neg b) \wedge (a \vee c \vee \neg d \vee e) \wedge (\neg b \vee d \vee \neg e) .$$

Determine in each of the following scenarios the exact size (number of nodes) of the spanned search tree:

- No interleaving.
- Reduction in every node.
- Reduction after every other variable assignment.

### Problem 11

Give an algorithm for PARTITION that runs in pseudopolynomial time.