

10th Exercise sheet for Advanced Algorithmics, SS 13

Hand In: Until Wednesday, 26.06.2013, 12:00am, Exercise sessions, hand-in box in stairwell 48-6 or email.

Problem 26

Let $\Sigma = \{+, -\}$ and for $j \leq i$

$$L(i, j) = \{w \in \Sigma^* \mid |w|_+ = i + j, |w|_- = j\}$$

the language of all sequences of $i + j$ + and j -.

Show that at least a third of all words in $L(i, j)$ contain (properly) more + than - in every suffix.

Problem 27

Analyze the behaviour of algorithm PRIMENUMBER(l, k) for

- i) $k = 2 \cdot \lceil \log_2 l \rceil$ and
- ii) $k = 2 \cdot (\lceil \log_2 l \rceil)^2$,

respectively.

Problem 28

Modify the algorithm CONTRACTION as follows. Instead of randomly choosing an edge and contracting, randomly choose two vertices x, y and identify them into one vertex.

Prove that for some (infinite class of) multigraphs, the probability that this modified algorithm finds a minimal cut is exponentially small in the number of vertices n .