Technische Universität München
Department of Informatics
Chair for Efficient Algorithms
Prof. Dr. Ernst W. Mayr/Dr. Jens Ernst
Johannes Nowak

Summer Term 2005
Exercise Sheet 7
June 14, 2005

Selected Topics in Computational Biology

Due: 21.06.2005 **after** *the lecture*

Exercise 1 (10 points)

Consider the searching algorithms for suffix arrays described in the lecture. Prove that the second approach, which has an expected running time of $O(m + \log n)$, still has a worst case complexity of $\Theta(m \log n)$.

Exercise 2 (10 points)

We consider again the searching algorithms for suffix arrays. Prove that the third approach described in the lecture has a worst case complexity of $\Theta(m + \log n)$.

Exercise 3 (10 points)

Show that the total size of the arrays *Llcp* and *Rlcp*, which are needed for the efficient searching algorithm, is bounded by $O(n)$.

Exercise 4 (10 points)

Describe how to create a suffix array for a text t of length n in $O(n)$ with help of a suffix tree. Why is the usefullness of this approach limited? Compare the space requirements of suffix trees and suffix arrays.