Technische Universität München
Fakultät für Informatik
Lehrstuhl für Effiziente Algorithmen
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Sommer Semester 2009
Problem Sheet 1
May 16, 2009

Python For Fine Programmers

Deadline: June 4, 2009

Problem 1 (6 Points)

Write a python program which implements a Binary Search Tree. Implement the methods for insertion, deletion, searching and traversal.
The binary tree class from previous lecture could be used as the base class.

Problem 2 (6 Points)

Write a python program to evaluate a mathematical expression (which uses +, -, * and /). (Hint: Infix to Postfix and use List as a stack)
Bonus: Implement the ability to have parenthesis.

Problem 3 (4 Points)

Implement any three of the set operations for any collective (list, sets) using lambda forms/functions

Problem 4 (6 Points)

Implement all the three order statistics algorithms (for finding the kth largest element in an array/list with n elements) discussed in the lecture.
The three algorithms:

- Sorting

- Using a binary search tree (from problem 1)

- Using a pivot element

Problem 5 (6 Points)

Implement three different methods to reverse a given string. The same functions are to be used for reversing a list as well.
Use the methods you implemented to implement the `rev` functionality of UNIX.