Exercise Sheet 5

Issue Date: November 21st, 2023
Due Date: November 27th, 2023 – 10:00 a.m.
$\sum$ 10 Points

Konzepte der Informatik INF-11700
Winter 2023/2024

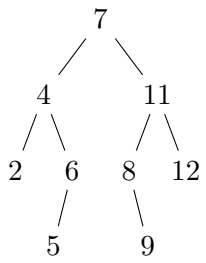
Universität Konstanz

University of Konstanz
Dr. Barbara Pampel
Sabrina Jaeger-Honz

Recursion, Divide & Conquer

Exercise 1: Recursion (*3 points*)

a) Which digit-sequence is output when traversing the tree below in ...



i. (1 point) ...postorder?
ii. (1 point) ...preorder?
iii. (1 point) ...inorder?

Exercise 2: Divide and Conquer (*7 points*)

a) (3 points) Sort the array $A = [12, 10, 3, 21, 17, 5, 9]$ non-descendingly using *MergeSort*. Visualize the progress by printing the part of A each call of `mergesort` is executed on, at the beginning and at the end of the call (each in a new line, analogous to the lecture slides).

b) (3 points) Sort the list $L = [10 - 7 - 5 - 15 - 13 - 3 - 6 - 11 - 4]$ non-descendingly using *QuickSort*. Visualize the progress by printing the lists (in the order they will be concatenated in and one print per line) at the point when they are **called** and **returned** by the algorithm (analogous to the lecture slides).

c) (1 point) Please provide an array (maximum length: 4) to show that *QuickSort* is on an **array** an unstable sorting algorithm.