PS Algorithms and Data Structures 2024

Task sheet 6

Task 16

Insert the following numbers in sequence into an AVL tree and carry out the necessary rotations: 5, 10, 15, 1, 7, 6

Task 17

A hash table of the size $m = 10^5$ with open addressing for collision avoidance is considered. Answer the following questions and justify your answers if there are already n elements in the table ($n = 35000, 80000, 95000, 99999$).

1. What is the maximum expected number of tests for a successful search of an element?
2. What is the maximum expected number of tests for unsuccessful searches of an element?

Task 18

It is given a binary search tree in which n numbers are stored, where n is an odd number. Formulate an algorithm for calculating the median of these numbers in time $O(n)$ that requires only $O(1)$ additional memory.

Hint: First think of an algorithm to determine the number of nodes in the tree.