

Exercise Sheet 10

Handout: November 21st — Deadline: December 5th before 4pm

Question 10.1 (0.5 Marks)

Insert the keys 8, 2, 1, 3, 6, 10, 9 in this order into an empty AVL tree. Draw the tree constructed after each insertion and after each (double-)rotation (cf. the example in the lecture notes). Write down the balance degree for each node next to the node as shown in the lecture notes.

Question 10.2 (0.5 marks)

Say the minimum number of nodes that an AVL tree of height $h = 10$ must contain.

Question 10.3 (2 marks) Implement an AVL tree using linked lists. You should implement an insert procedure which should run in $O(\log n)$ time while the balancing, including adjusting the balance factors, should run in constant time $\Theta(1)$. You don't need to implement a delete procedure (although if you do, you get a bonus of doubling your marks if it is correct).

In input you get a set of *distinct* integers that are the keys that need to be inserted in that order: eg., 8, 2, 1, 3, 6, 10, 9.

Output: print the tree INORDER.