Last name	
First name	
Group	

Grade	

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Algorithmics
Undergraduate 1st year S2#
Final Exam #2 (P2)
8 January 2019 - 11 : 00
Answer Sheets

Answers 1 **(How many? –** ***3,5 points*****)**

Specifications:

The function `nb_inter(B, a, b)` computes the number of values of the binary search tree B in the interval $[a, b[$

***Answers 2* (BST → AVL – *4,5 points*)**

Specifications:

The function `makeAVL(`B`)` builds a copy of the binary tree B with the balance factors specified in each node.

***Answers 3* (AVL - Add 0 – *5 points*)**

Specifications:

The function `add0(`A`)` inserts the value 0 in the AVL A (that contains only non-zero naturals). It returns a pair: the tree after insertion and a boolean that indicates whether the tree height has changed.

Answers 4 **(AVL –** ***3 points*****)**

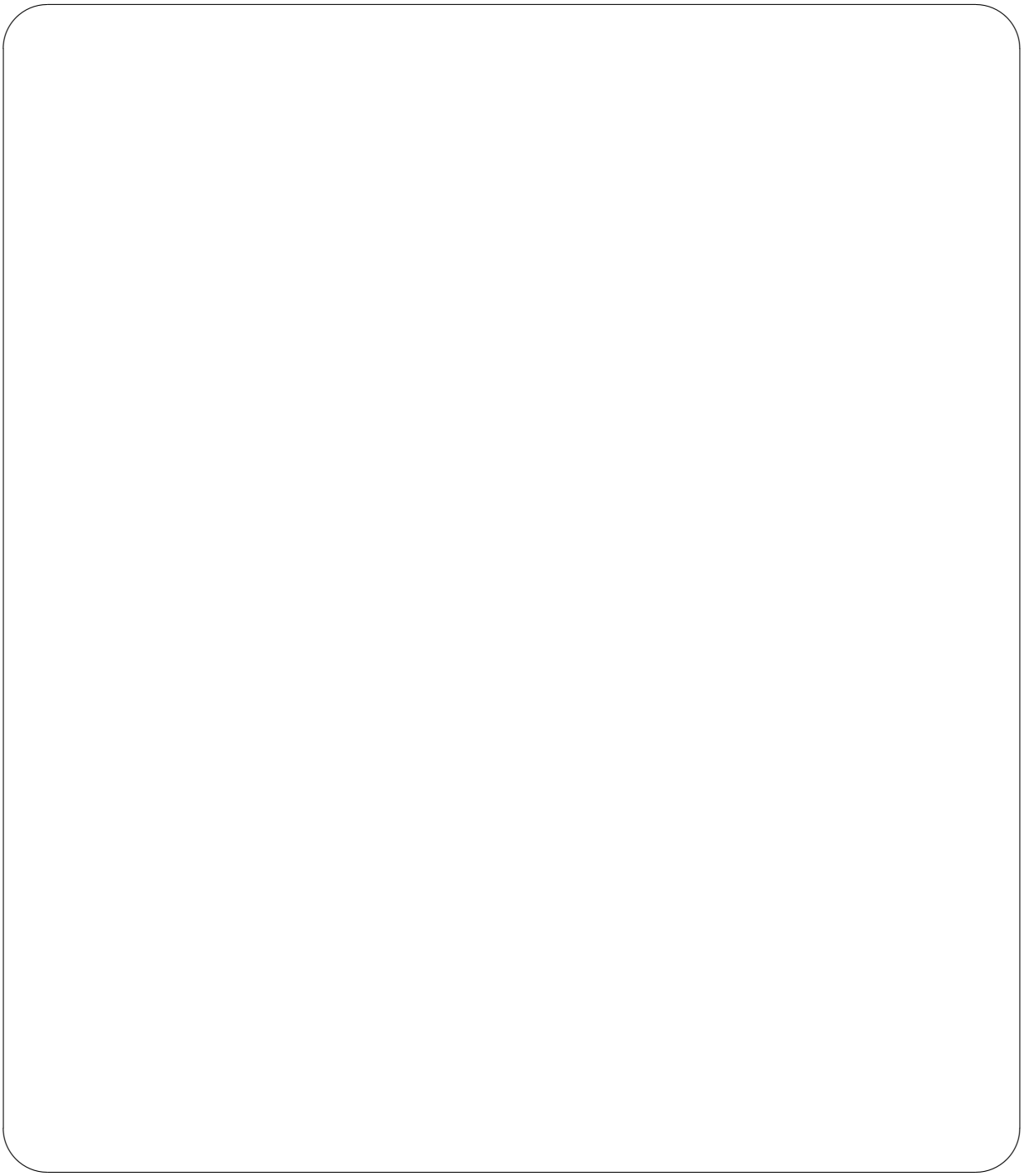
Tree built by insertions of 13, 20, 5, 1, 15, 10, 18:

Tree after insertions of 25, 4 and 21:

Tree after insertions of 7, 12 and 23:

***Answers 5* (2.4-tree → Red-black Tree – *2 points*)**

1. *Red-black tree associated with the 2-4 tree of the subject:*



2. *Is this an AVL?* YES - NO

   Justification:

Answers 6 **(Trees and mystery –** ***4 points*****)**

1. *Tree built by* `makeTree(13)`*:*

2. *Properties of the tree built by* `makeTree(`n`)` *(*$n > 0$*)*:

   (a) _____

   (b) _____