



Arab Academy for Science & Technology and Maritime Transport (AASTMT)

College of Computing and Information Technology (CCIT)

Computing Alg. CS312 – Spring 2014

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**Q1.**

Consider the problem of finding the distance between the two closest numbers in an array of  $n$  numbers. (The distance between two numbers  $x$  and  $y$  is computed as  $|x - y|$ .)

- a. Design a presorting-based algorithm for solving this problem and determine its efficiency class.
- b. Compare the efficiency of this algorithm with that of the brute-force algorithm (see Problem 9 in Exercises 1.2).

**Q2.**

Solve the following system by Gaussian elimination:

$$x_1 + x_2 + x_3 = 2$$

$$2x_1 + x_2 + x_3 = 3$$

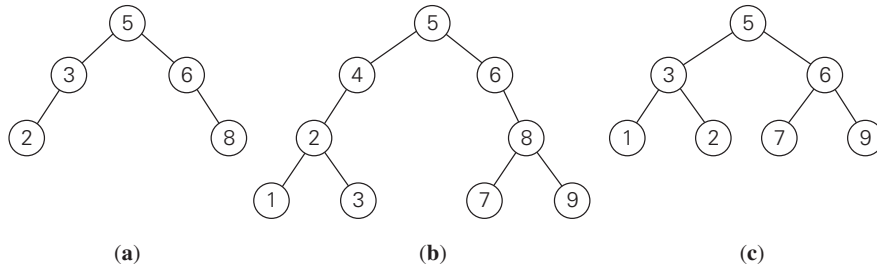
$$x_1 - x_2 + 3x_3 = 8.$$

**Hint:**

Trace the algorithm as we did in solving another system in the section.

**Q3:**

Which of the following binary trees are AVL trees?



**Hint:**

Use the definition of AVL trees. Do not forget that an AVL tree is a special case of a binary search tree.

**Q4:**

For each of the following lists, construct an AVL tree by inserting their elements successively, starting with the empty tree.

- a. 1,2,3,4,5,6
- b. 6,5,4,3,2,1
- c. 3,6,5,1,2,4

**Hint:**

Insert the keys one after another doing appropriate rotations the way it was done in the section's example.